ILLINOIS MINERAL INDUSTRY IN 1989

and Review of Preliminary Mineral Production Data for 1990

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Department of Energy and Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY

ILLINOIS MINERALS 108
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Cover Photo: Surface mining of coal at the Arch of Illinois Captain Mine in Perry County (photo by Joel Dexter).

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EXECUTIVE SUMMARY

This report covers three types of mineral industry operations in Illinois (fig. 1):

- extracting minerals from the ground
- processing crude minerals (mined primarily out of state) into raw industrial materials
- manufacturing mineral products such as coke, lime, and cement from minerals extracted and processed primarily, but not exclusively, in Illinois.

1989 Reported Value

The total reported value of minerals extracted, processed, and manufactured in Illinois during 1989 rose to $2,842.9 million, 1.2 percent higher than the 1988 total. The total of the values reported to the U.S. Bureau of Mines (USBM) is not necessarily the actual value because many producers do not report their production figures. Minerals extracted accounted for 89.7 percent

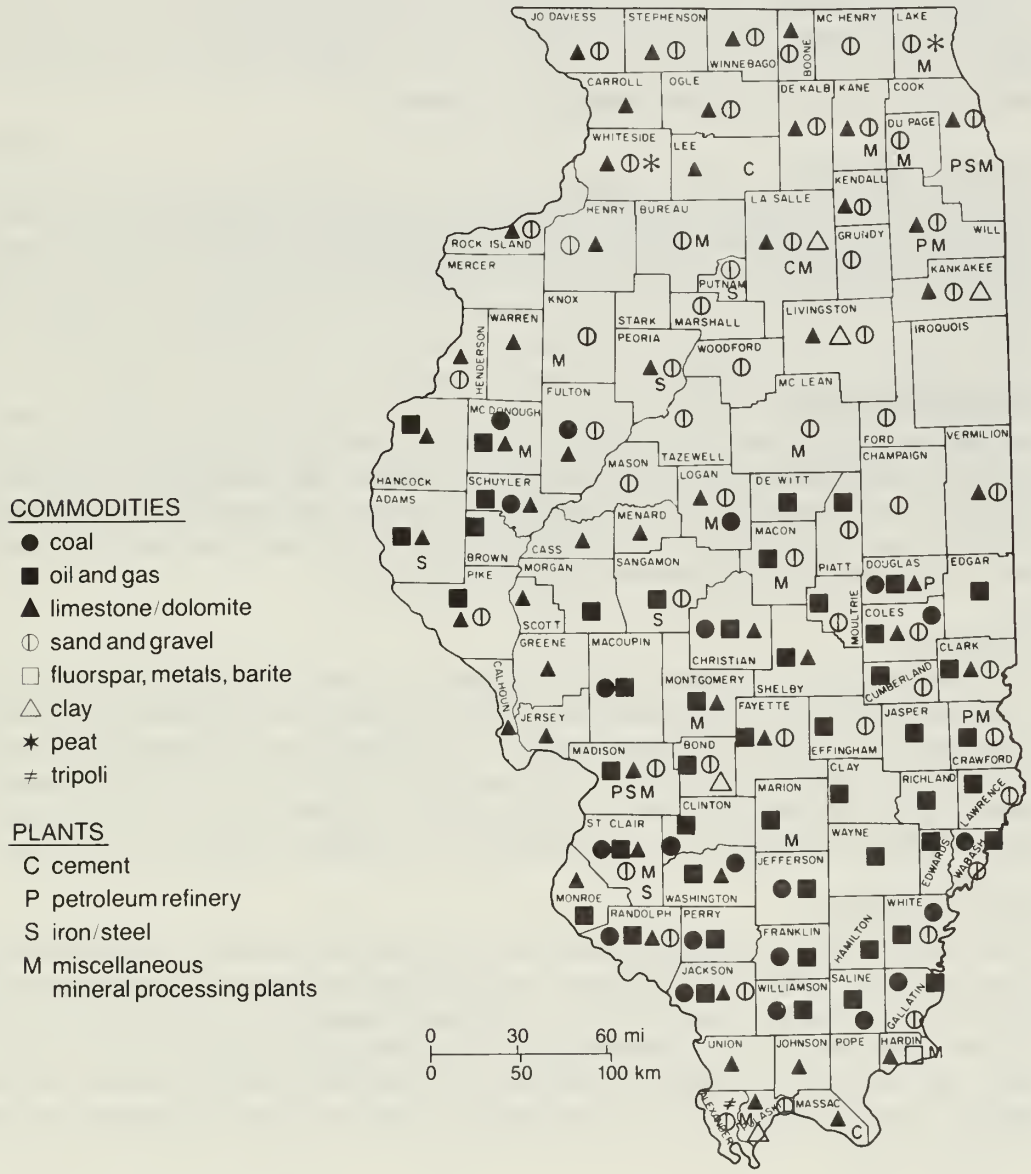

Figure 1 Mineral production in Illinois and mineral-processing plants.

of the reported value; crude minerals processed and manufactured minerals accounted for the remaining 10.3 percent. The leading commodities continued to be coal and oil, followed by industrial and construction materials (table 1; tables begin on page 22).

Illinois produced 5.8 percent of the tonnage and about 7.5 percent of the value of the coal produced nationally. The state continued to lead the nation in the production of fluorspar, industrial sand, and tripoli. Production of stone and sand and gravel were 5.0 and 4.1 percent of the national total, respectively (table 2).

Extracted Minerals

The value of commodities mined in Illinois in 1989 was $2,550.9 million, an increase of 2.4 percent from 1988. Mineral fuels (coal, crude oil, and natural gas) accounted for 81.5 percent of the total. Industrial and construction materials such as clay, fluorspar, sand and gravel, stone, and tripoli accounted for 18.2 percent. The remaining 0.3 percent came from metals, such as lead, zinc, and silver, and from other minerals, such as peat and gemstones.

In 1989, mineral extraction was reported by 98 of the 102 counties in Illinois (table 3, fig. 1). Only Iroquois, Mercer, Pope, and Stark Counties had no reported mineral extraction. Perry and Franklin Counties, major producers of coal and crude oil, accounted for 11.1 and 8.0 percent of the state's total value of minerals produced, respectively.

Processed Minerals

Figures for total reported value of processed minerals in 1989 are incomplete. The total includes only expanded perlite, sulfur, calcined gypsum, and exfoliated vermiculite. Minerals not included on this list, but processed in the state, include natural gas liquids, iron-oxide pigments, crude iodine, ground barite, bismuth, columbium, tantalum, and primary and secondary slab zinc.

Manufactured Mineral Products

Manufactured mineral products in Illinois, primarily from minerals mined within the state, included cement (portland and masonry), coke, clay products, lime, and glass. The value of sales of portland cement increased 15.2 percent; masonry cement declined 27.6 percent. Lime production was up 4.2 percent and its value 5.5 percent. Clay products decreased 10.4 percent in value. Figures are no longer available for coke and glass.

Employment

The Illinois Department of Labor reported a 3-percent increase in employment in the state's mineral industries, from 117,000 workers in 1988 to 120,500 workers in 1989. Jobs in mining, quarrying, and oil and gas extraction continued a downward trend, decreasing 6.2 percent from 21,100 workers in 1988 to 19,800 in 1989. However, as was the case in 1988, this was compensated for by an increase in employment in mineral processing, from 61,300 to 63,800 persons, and in the manufactured mineral sector from 34,600 to 36,900 persons (table 4).

Mineral Shipments

Mineral shipments are a large part of the Illinois transportation industry. Stone and sand and gravel are usually shipped by truck, since these products are used primarily near the quarries. Coal is primarily shipped by rail, barge, or rail/barge combination; only about 5 percent of the coal was moved to mine-mouth, electricity-generating plants by conveyor belt. Crude oil and natural gas are mainly transported by pipeline. Other materials, such as fluorspar and clay products, were shipped by rail, truck, and barge. Pig iron and coke are generally used on site by integrated mills.

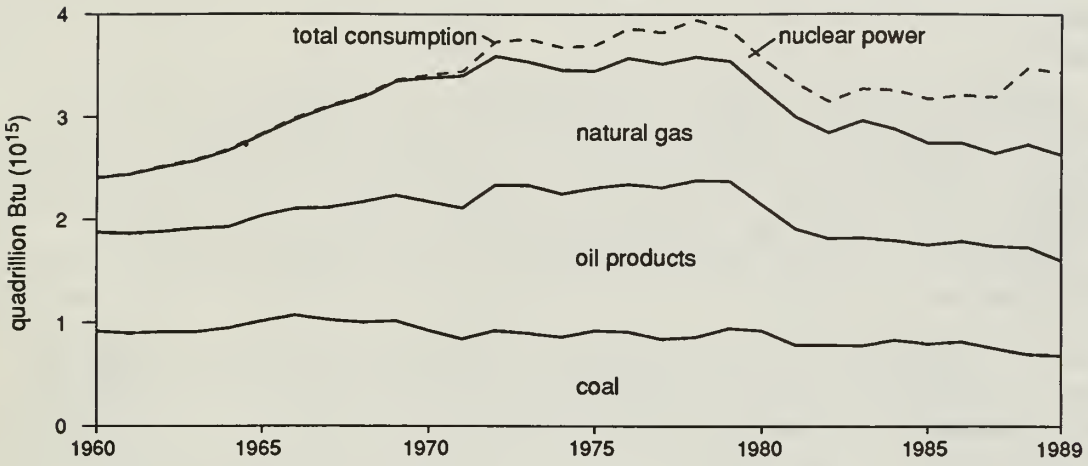

Figure 2 Energy used in Illinois, 1960-1989.

Consumption

The value of the state's consumption of mineral commodities in 1989 was about 5 percent of the nation's total, or about the same proportion as Illinois' share of the total U.S. population. In physical units, Illinois' mineral consumption varied from less than 1 percent of the U.S. total (for kerosene) to almost 16 percent (for zinc) (table 5). The high zinc consumption reflects Illinois' status as a major manufacturing state.

The state's energy consumption in 1989 was estimated at 3.4 quadrillion Btu (4.3 percent of the U. S. total), slightly lower than 1988 (table 6). Fossil fuels provided about 77 percent of the state's energy needs: 27 percent by oil and oil products, 30 percent by natural gas, and 20 percent by coal (fig. 2). Illinois consumed 804 trillion Btu of nuclear power in 1989, compared with 743 trillion Btu in 1988. In 1988 for the first time in Illinois, consumption of nuclear generated energy exceeded the amount produced by coal.

MINERALS EXTRACTED

Fuels

Coal

Production Among the coal-producing states, Illinois ranked fifth, behind Wyoming, Kentucky, West Virginia, and Pennsylvania, with 60.1 million tons produced or 6.2 percent of total U.S. coal production in 1989. This production was valued at $1,694 million, approximately 1 percent less than 1988 (table 7). The unit value of $28.17 per ton was 1.3 percent less than the $28.55 per ton in 1988. Coal production increased less than 0.5 percent in 1989.

Twenty-one counties produced coal in 1989 (fig. 3). Perry, Franklin, Randolph, and Saline Counties together accounted for 51.4 percent of the state's total production. In 1989, Perry County was again the state's top producer, contributing about 18.7 percent of all coal produced in the state. Approximately 98 percent of its coal came from surface mines. The county produced more than 56 percent of the state's surface-mined coal. Jackson County contributed about 11 percent of the surface-mined coal. Franklin County, with all its tonnage coming from underground, contributed about 19 percent of the underground production total. Saline and

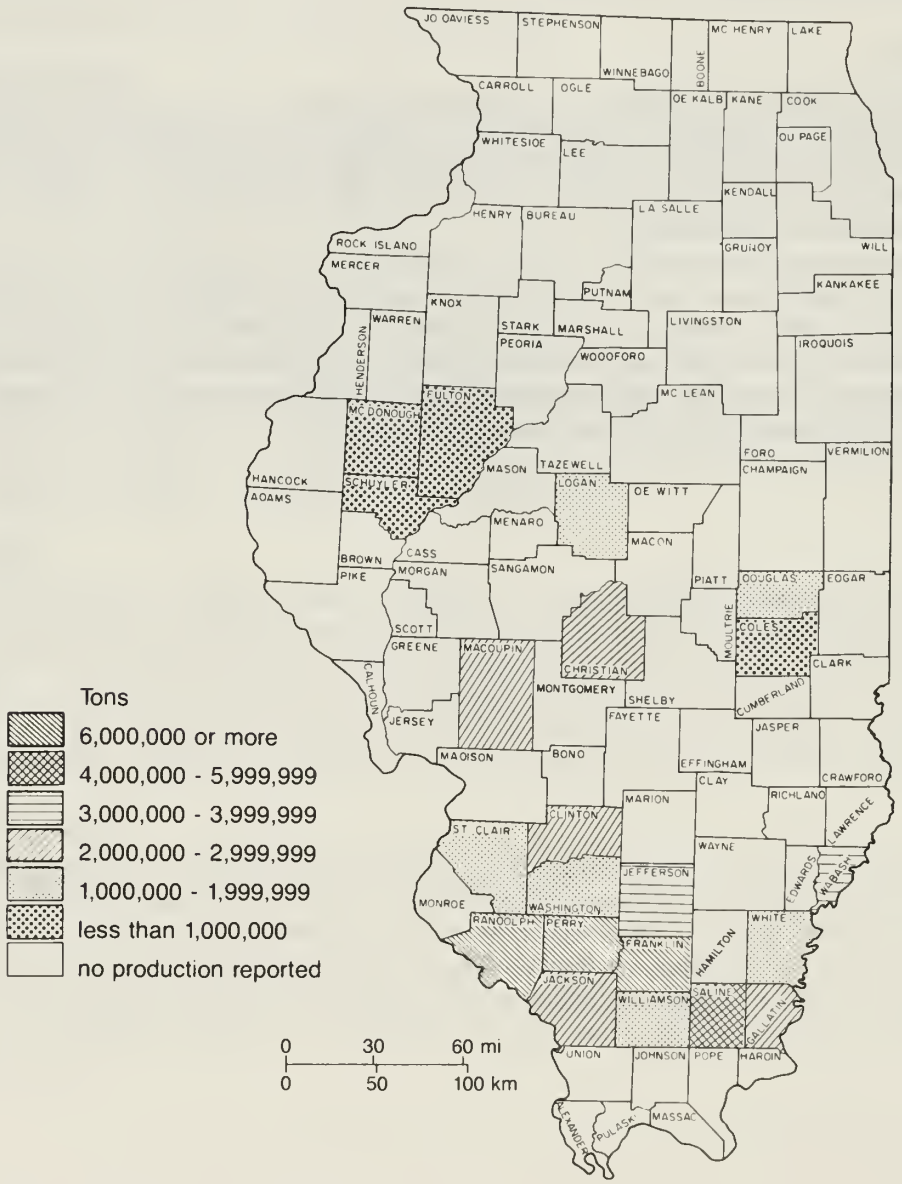

Figure 3 Illinois coal production in 1989.

Randolph Counties each added approximately 12 percent of the underground production. Other counties contributing substantially to underground coal production were Jefferson with about 9 percent and Wabash with more than 7 percent. Approximately 67 percent of the state's total production came from underground and about 33 percent came from surface mines (fig. 4).

The number of coal mines operating in Illinois has been steadily declining since the early 1900s. There were 920 mines in 1900. By the 1950s, approximately 200 mines were in operation. A further rapid decline to about 60 mines had occurred by 1970. In the latter half of the 1970s, the number of mines increased to about 70 as new mines opened after the first oil-price shock of 1974. Demand for coal did not increase, however, and the number of mines again dropped. By 1989, only 42 mines remained in operation: 27 underground and 15 surface mines (fig. 5).

The proportions of underground- and surface-mined coal have reversed in Illinois in the last 20 years as a result of changing economic and geologic conditions. This trend toward increased underground mining is expected to continue as surface-minable resources are depleted. Although part of the reason for reduced production from surface mines is the limited availability of surface-minable coal reserves, the cost of reclamation also contributes to the trend. Conversely, increased production from underground mines coupled with high-extraction mining techniques leads to ground subsidence and its attendant mitigation costs.

Illinois mines have produced about 5.38 billion tons of coal since 1833 (table 8). Surface mines operating since 1911 have accounted for 1.27 billion tons or 23.7 percent of total. The average output per underground mine reached a peak of 1.52 million tons in 1975; since that time, average output has fluctuated between 0.9 and 1.48 million tons per year. In 1989, the

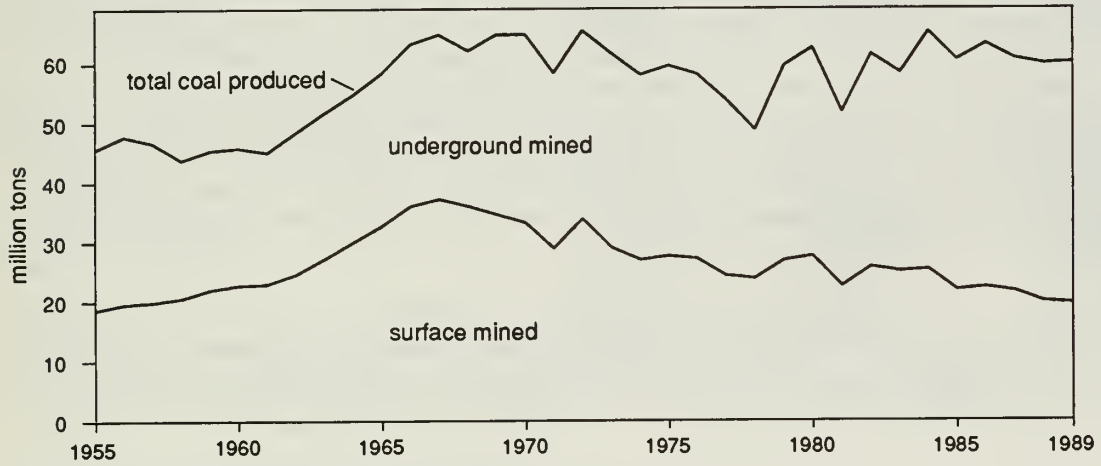

Figure 4 Trends in coal production in Illinois.

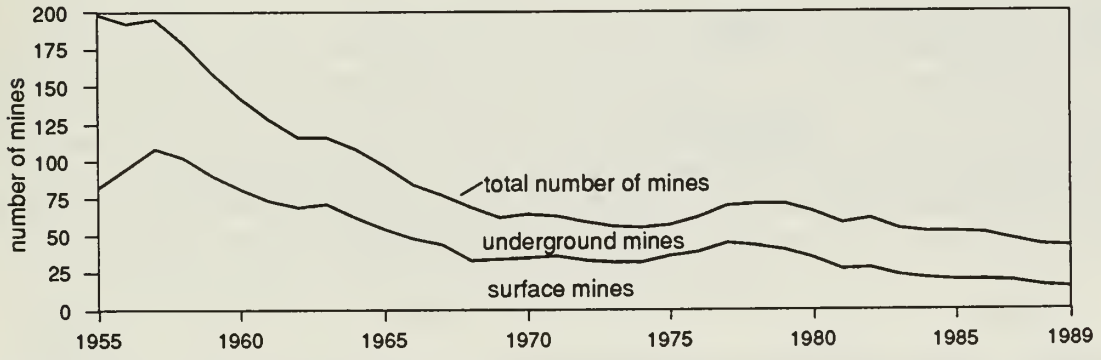

Figure 5 Trends in the number of mines in Illinois.

average output was 1.5 million tons, 1.3 percent below the record high. The average surface-mine output, which had been rising between 1977 and 1984, declined about 10 percent in 1985, but has been increasing since then, reaching 1.31 million tons in 1989 (table 9).

The trend in Illinois is toward fewer but larger coal mines. Of the 21 coal mining companies in Illinois in 1989, the top five companies—Peabody, Consolidation, Old Ben, Arch of Illinois, and AMAX—produced about 62 percent of the state's total output (table 10). The share of the top five companies did not change significantly during the 1980s. By comparison, the U.S. coal mining industry is much less concentrated. In 1989 the top five U.S. companies produced 24.5 percent of the national total. The top two Illinois companies, Peabody and Consolidation, also are the top two companies in the United States.

Employment and wages In 1989 employment in Illinois coal mines decreased 3.6 percent to 11,105 from 11,514 in 1988 (table 9). Employment in the mines has declined about 40 percent from since the 1979 high of 18,499. Underground-mine employment decreased 1.1 percent, and surface-mine employment by 11.5 percent. Average hourly wages rose to $18.59 in 1989, up from $18.21 in 1988 (table 4). The average number of hours worked weekly increased to 42.7 from 39.7 in 1988.

Mine productivity Productivity is calculated by multiplying average production per miner per hour by the average length of a miner's shift. Unrounded data are used in calculating percentage changes. The labor productivity of underground mining operations in 1989 increased to 20.35 tons from the previous year's 20.30 tons. The peak level was 22.9 tons in 1969. In surface mines, labor productivity increased 18.4 percent to 31.6 tons from 26.7 tons in 1988. The peak year was 1967 with 41.6 tons (fig. 6). Although the average productivity levels in underground and surface mines for the nation as a whole have surpassed their past peaks reached in 1969 and 1974, the productivity levels in Illinois mines have yet to return to the past peak levels. In fact, as figure 6 indicates, productivity of Illinois underground mines in 1989 was surpassed by the U.S. average for the first time, and the gap between the U.S. and Illinois surface-mine productivity has been widening since about 1975. This difference in mine labor productivity at the national versus state level indicates that the economic competitiveness of Illinois coal has declined during the 1980s.

Prices The average price (f.o.b. mine) of Illinois coal dropped 1.3 percent from $28.55 to $28.17 per ton (table 7). The average price of coal mined underground in Illinois was $28.66 per ton, a 3.2-percent decrease from 1988, and the price of surface-mined coal was $27.20 per ton, a 2.6-percent increase.

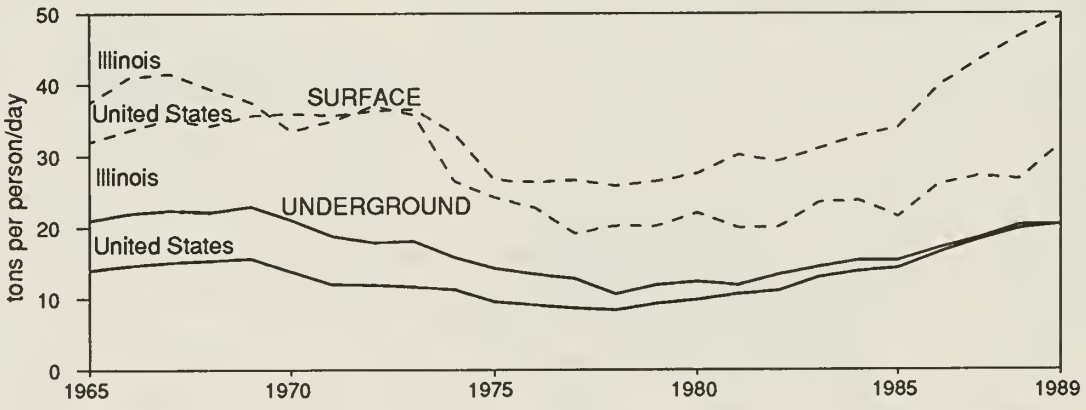

Figure 6 Trends in the productivity of coal mining, 1965-1989.

Shipments Illinois coal was used in 23 states to generate electricity, manufacture coke, and supply energy for other industries. About 90 percent of Illinois coal was sold to electric utility plants, 3 percent to plants manufacturing metallurgical coke, and 7 percent to industrial plants and retail dealers in 1989 (table 11). Shipments to electric utilities increased about 2 percent from 52.3 million tons in 1988 to 53.4 million tons in 1989, but only about 28 percent was shipped within the state. Out-of-state shipments to utilities increased about 1 percent; 34 percent of the out-of-state shipments went to Missouri, 24 percent to Georgia and Florida, and 21 percent to Indiana.

About 72 percent of Illinois coal used in making coke was shipped to coking plants in northwestern Indiana and the remainder was consumed within the state. Of the Illinois coal used for other industrial activities, about 57 percent was consumed within the state, and about 18 percent was shipped to Missouri, 8 percent each to Iowa and Wisconsin, and 4 percent to Indiana.

Transportation Coal was shipped from mines to the consumer by rail, barge, and truck. Barge or rail/barge combination has been gaining importance in Illinois as transportation costs become an important aspect of price competition. Illinois coal depends primarily on out-of-state markets and transportation costs must be kept low to compete with other coals.

	Tonnage[1]		
	1987[2]	1988[2]	1989
Rail	38,563,747	35,010,520	34,668,177
Barge or rail/barge[3]	11,664,995	17,110,495	17,514,528
Local trade and truck[4]	8,791,572	7,755,903	7,846,818
Rail Lines			
Illinois Central Gulf	17,627,538	18,428,442	22,657,159
Union Pacific	15,857,295	15,026,302	10,795,330
Norfolk-Southern	6,495,336	5,968,193	5,500,783
Chicago-Northwestern	1,674,509	1,748,509	1,953,006
Burlington Northern	1,725,162	2,574,678	1,827,505
Others	6,443,773	6,066,900	7,030,897
Total rail	49,823,613	49,813,024	49,764,680

[1] Tonnages do not total because part of the rail tonnage is shown in the combined rail/barge category, and some was shipped from inventory.
[2] Revised.
[3] Part of this coal sent from mine to barge-loading facility by conveyor belt.
[4] Part of this coal was sent by truck to barge.
Source: Illinois Department of Mines and Minerals.

Consumption Illinois coal consumption decreased for the third consecutive year, declining more than 8 percent to 30.1 million tons (table 12). After reaching a high of 20.8 million tons in 1984, total annual coal shipments from Illinois mines to Illinois markets have declined by 16 percent. The decline was the result of increased use of nuclear energy. From 1984 to 1989, total coal consumed by Illinois electric utilities declined about 23 percent, 6 percent in the past year alone. Coking-coal consumption increased about 22 percent in 1989. Illinois coal shipped to coking plants in Illinois increased considerably; however, industrial consumption fell 32 percent. In 1968, more than 82 percent of the total coal consumed in Illinois was also produced within the state; in 1989, in-state mines supplied only 58 percent.

Crude Oil

Production Crude oil experienced a decline (9.3 percent) in production for the fourth straight year. From 1985 to 1989, production decreased 32.6 percent. The 1989 production of

20.4 million barrels was the lowest in more than 50 years. The 1989 production was valued at $380.7 million, with an average unit value of $18.68 per barrel, a 26.3-percent increase in per-barrel value from 1988 (table 1). The secondary production method of waterflooding accounted for approximately 9.6 million barrels, or about 47 percent of the state's total. Pressure-maintenance operations produced an estimated 61,000 barrels, or 0.3 percent of the state's total (fig. 7). About 3.4 billion barrels of oil have been produced in Illinois during the past 101 years (table 13).

Illinois ranked 15th of 31 oil-producing states in 1989. Forty-seven counties produced crude oil (table 13). The following seven counties produced more than 1 million barrels each, contributing about 56 percent of the state's total oil production.

County	*1988*	*1989*	*County*	*1988*	*1989*
Lawrence	13.0%	13.8%	Marion	5.9%	5.5%
Crawford	9.8	10.0	Wabash	5.1	5.0
White	9.3	9.0	Clay	4.9	5.0
Wayne	7.7	7.6			

An oil field producing more than 200,000 barrels per year is considered a major field in Illinois. There were 15 major fields in both 1988 and 1989. The combined production of these fields in 1989 amounted to 60.7 percent of the state's total (table 14). The three largest fields—Lawrence, Clay City Consolidated, and Main Consolidated—each produced more than 1 million barrels during 1989 or 34.2 percent of the state's total. In 1989, 27 new wells reported an initial production of 100 barrels of oil per day. The highest initial production reported during the year was 840 barrels of oil per day from a field in White County. The average daily per-well production in Illinois remains well below three barrels, and thus the state remains highly sensitive to oil price changes.

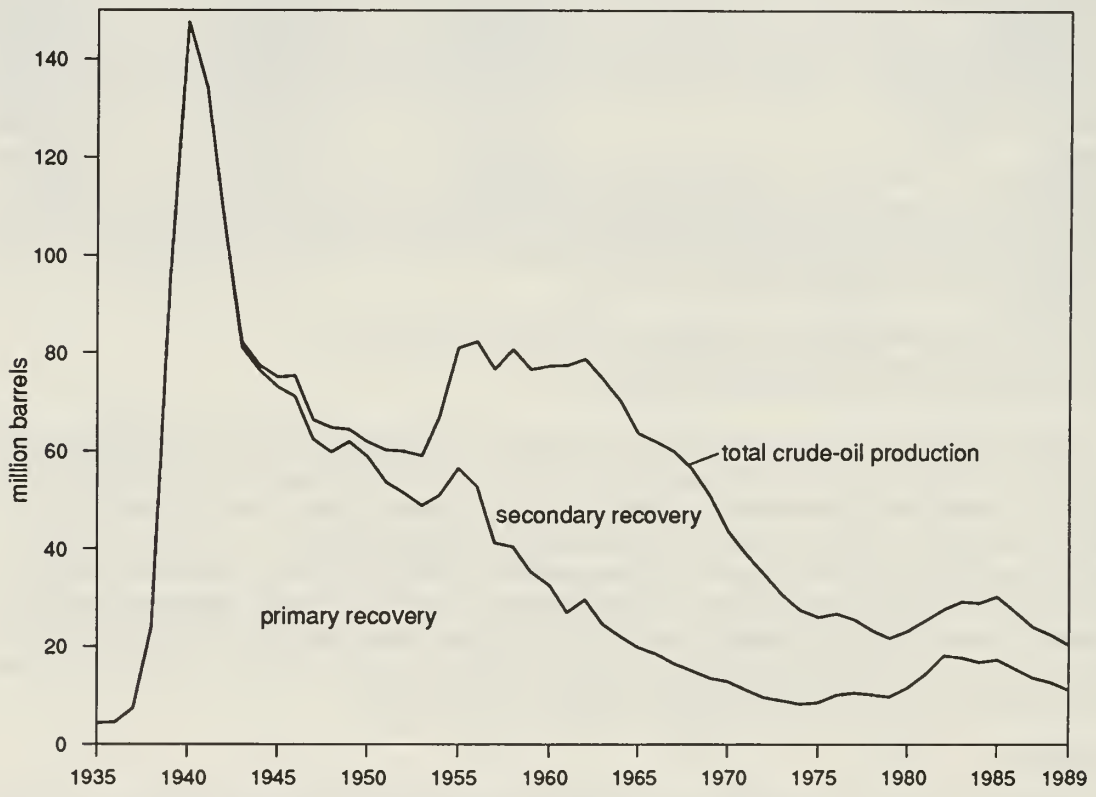

Figure 7 Annual crude-oil production in Illinois.

Crude-oil production reached a peak of 147.6 million barrels in 1940 (fig. 7). From that level, oil production by primary recovery methods declined steadily until 1973, although some years showed small gains. Introduction of the hydraulic rock fracturing method in 1954 and the increased use of waterflooding stabilized oil production at about 78 million barrels per year from 1955 to 1962. Production fell steadily after 1962 as reserves were depleted. In 1989, production fell to the lowest level (20.4 million barrels) since 1937 when it was just 7.4 million barrels.

By December 1989, proved reserves were 123 million barrels, a 14-percent decrease from December 1988. Current reserves are 82 percent below the 700 million barrels of reserves of January 1956.

Refineries At the beginning of 1990, Illinois had six operating refineries, the same as the year before. The refineries are located in Cook, Crawford, Madison, and Will Counties. Total refining capacity was 882,600 barrels per day, or nearly 16 times the daily oil production in Illinois. Refining capacity was down about 1 percent from January 1, 1989.

Consumption Reported consumption of major petroleum products in Illinois decreased about 12 percent in 1989. This was due mainly to the 65.7-percent drop in reported consumption of liquified petroleum gases (LPG). The reported use of LPG by the chemical industry decreased about 95 percent from 1988 to 1989. LPG is used as feedstock by the petrochemical industry and for manufacture of synthetic rubber. The use of motor gasoline, residual fuel oil, and other categories declined; kerosene, distillate fuel oil, lubricants, asphalt, and road oil all increased (table 15).

Natural Gas

Production Although natural gas is not produced in large quantities in Illinois, the state's reported production of natural gas increased 10.4 percent in 1989. Gas wells yielded 1.7 percent less than the previous year, but gas from oil wells increased 15.3 percent (table 16). Morgan County was the top producer with 37 percent of the state's total production, followed by Wayne County (13.5 percent), Adams County (13 percent), and Pike and Coles Counties (10 percent each)(table 17). The average wellhead value of Illinois gas decreased 2 percent from $2.19 per thousand cubic feet (Mcf) in 1988 to $2.15 per Mcf in 1989 (table 1).

Consumption Reported natural-gas consumption in Illinois increased 2.8 percent in 1989 (table 18). The average value of natural gas consumed in Illinois increased 8.0 percent from $4.35 per Mcf in 1988 to $4.70 per Mcf in 1989. Natural-gas consumption has been on a downward trend

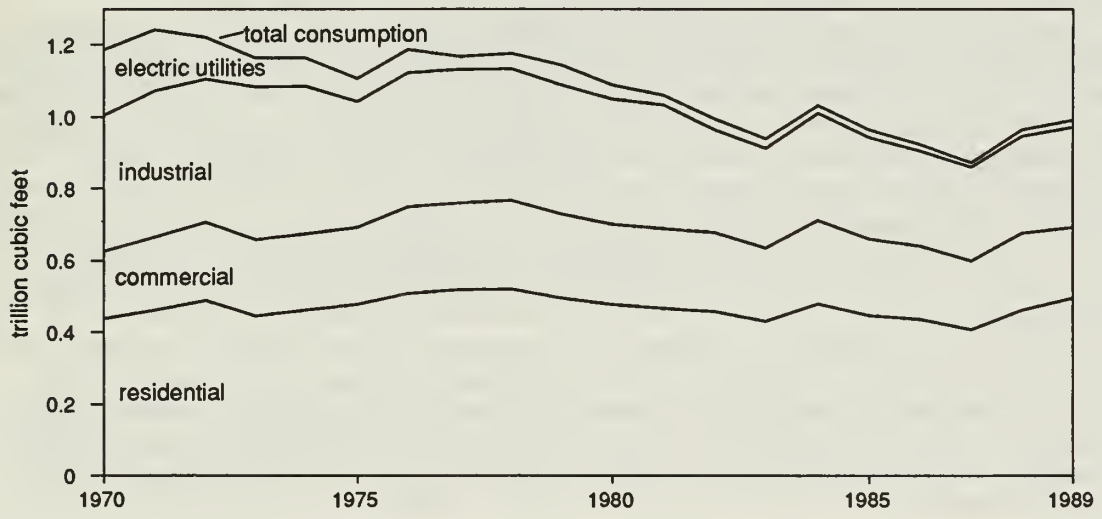

Figure 8 Consumption of natural gas, 1970-1989

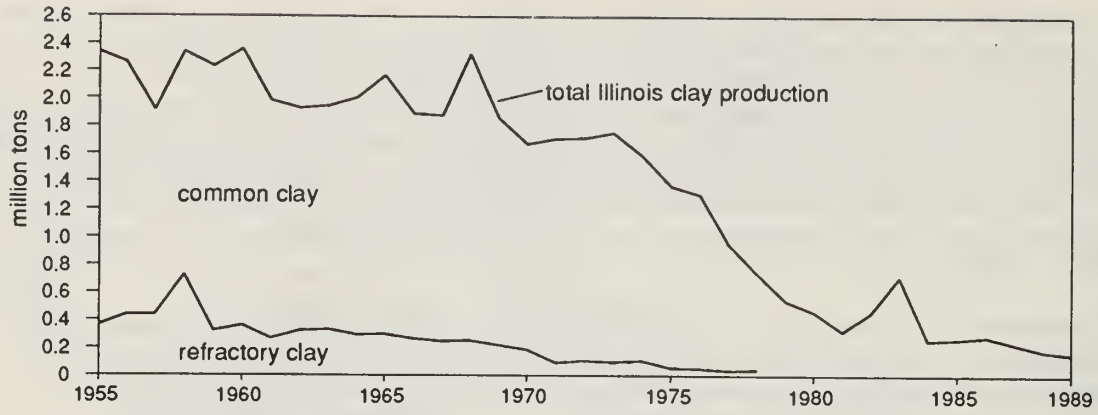

Figure 9 Trends in clay production, 1955-1989.

since 1971 (fig. 8); however, consumption increased in all categories except commercial in 1989. Although the largest percentage increase was with electric utilities, it represented only a small volume of gas.

Industrial and Construction Materials

Primary Barite

An accessory mineral in fluorspar ore, barite had been recovered as a byproduct by the fluorspar industry of Hardin County from 1974 to 1985, but Ozark-Mahoning, the only producer, shut down the barite circuit at its Rosiclare mill in 1985. They reopened in 1989, however, and produced barite. Barite is used primarily as a weighting agent in mud systems used to drill for oil and gas. Other uses include manufacture of paints, glass, rubber, and barium chemicals.

Clays

Production Both common clay and absorbent clay (fuller's earth) are mined in Illinois. Common clay is defined as a clay or claylike material that is sufficiently plastic to permit ready molding. Fuller's earth is a clay or claylike material that has absorbing, decolorizing, and purifying properties. Illinois clay production (excluding fuller's earth) continued its downward trend in 1989, decreasing from 180,306 tons in 1988 to 156,756 tons (fig. 9). Nationally, the clay industry has been growing steadily for several years. In 1989, however, total U.S. production of clays decreased 5.1 percent. In Illinois, the downturn began 20 years ago and continued in 1989 as competition from cheaper southern clays remained keen.

The average value per ton of common clay in 1989 increased to $4.09. The total value fell 9 percent to $641,237. Production of common clay was reported from five companies in four counties. Bond County remained the leading producer of common clay, with Livingston County running second. La Salle and Kankakee Counties also produced common clay. Two companies produce absorbent clay (fuller's earth) from Pulaski County. Their combined production increased 35 percent and the value 27 percent in 1989.

Uses Common clays and shales mined in Illinois are used to manufacture bricks, sewer pipes, drain tiles, wall tiles, dinnerware, lightweight aggregates, and cement. The primary product use in 1989 remained building bricks, which accounted for about 80 percent of Illinois clay production.

About 15 percent of the state's common clay production in 1989 was used for portland cement, structural concrete, concrete blocks, and highway surfacing, unchanged from 1988. Sales of Illinois clay to manufacturers of sewer pipe and drain tile accounted for the remaining 5 percent of production. This sector's demand dropped 71 percent in the last 2 years. Absorbent clay from Pulaski County was used mainly in the production of animal litter and oil and grease absorbent.

Fluorspar

Production and shipments U.S. production of finished fluorspar appears to have stabilized at about 70,000 tons during the 1980s. Lower production levels of 61,000 tons in 1983, the lowest in 50 years, and 66,000 tons in 1985 were partially offset by the 1986 high of 78,000 tons. The United States depends on foreign sources for more than 90 percent of its fluorspar requirements.

Illinois continued to be the nation's leading producer of fluorspar, with a small amount produced in Nevada. Zinc (sphalerite) and lead (galena) concentrates were recovered as coproducts of fluorspar processing in Illinois. In addition to the fluorspar mined in Illinois, about 58,000 tons of fluosilicic acid (FSA) was recovered from nine phosphoric acid plants processing phosphate rock. That was equivalent to 102,000 tons of fluorspar based on the fluorine content of the fluorspar and fluosilicic acid. FSA was used primarily in water fluoridation, either directly or after being converted to sodium silicofluoride; it was also used by the aluminum industry.

Ozark-Mahoning Company, the nation's largest fluorspar producer, operated two mines and a flotation plant near Rosiclare in Hardin County. Pennwalt Corporation, the parent company of Ozark-Mahoning Company, was acquired by the French oil giant Societé Nationale Elf Aquitaine in January 1990. The company reorganized, and the subsidiaries, including Pennwalt, became Atochem North America.

Consumption Reported consumption of fluorspar (acid-spar and met-spar only) in the United States increased 16.5 percent from 551,055 tons in 1988 to 641,882 tons in 1989. More than 60 percent of the reported production went into the production of hydrofluoric acid, the primary ingredient in most organic and inorganic fluorine-bearing chemicals. Hydrofluoric acid is also used in processing aluminum and uranium. More than 20 percent of the fluorspar production was used by the steel industry as a flux by the ceramics industry in manufacturing glass, welding rod coatings, enamels, and for water fluoridation (fluosilicic acid).

The apparent U.S. consumption (production + imports - exports ± change in stocks) increased from 723,804 tons in 1988 to 738,825 tons in 1989, a 2.1-percent gain. The discrepancy between apparent and reported consumption is often large for many minerals, including fluorspar, because not all users report consumption to the USBM.

Sand and Gravel

Since 1981, the USBM has been surveying sand and gravel producers only in even-numbered years. In odd-numbered years, only estimates are published. In 1985, the USBM began compiling sand and gravel production by district rather than by county to preserve the confidentiality of individual producers (fig. 10). Individual county data are no longer available.

Production and uses Sand and gravel deposits are widely distributed in Illinois. Glacial deposits, chiefly valley trains and outwash plains, are the principal sources of construction sand and gravel. Production was estimated to be 33 million tons in 1989, an increase of more than 9 percent from 1988. The combined value of sand and gravel was estimated at $108.9 million, with an average estimated unit value at the pit of $3.30 per ton, up 6.1 percent from 1988 (table 1). Illinois ranked fifth of 50 states in production of sand and gravel in 1989. The Meyer Material Corporation, West plant at McHenry, ranked 13th among U.S. sand and gravel plants and Vulcan Materials Corporation, Crystal Lake plant, ranked 19th.

In 1988, 107 companies operated 157 pits at 155 operations in 55 counties of Illinois (fig. 10). In 1989, there was a substantial increase in production because of the strong housing market and continued road construction, especially in the Chicago metropolitan area.

Transportation Because of its low unit price, most construction sand and gravel is not shipped farther than about 50 miles from the pit. Operations on navigable rivers may ship material much farther by barge. More than half the material was shipped by truck in 1989, with the remainder being shipped by barge or used at the pit, for example, in asphalt production.

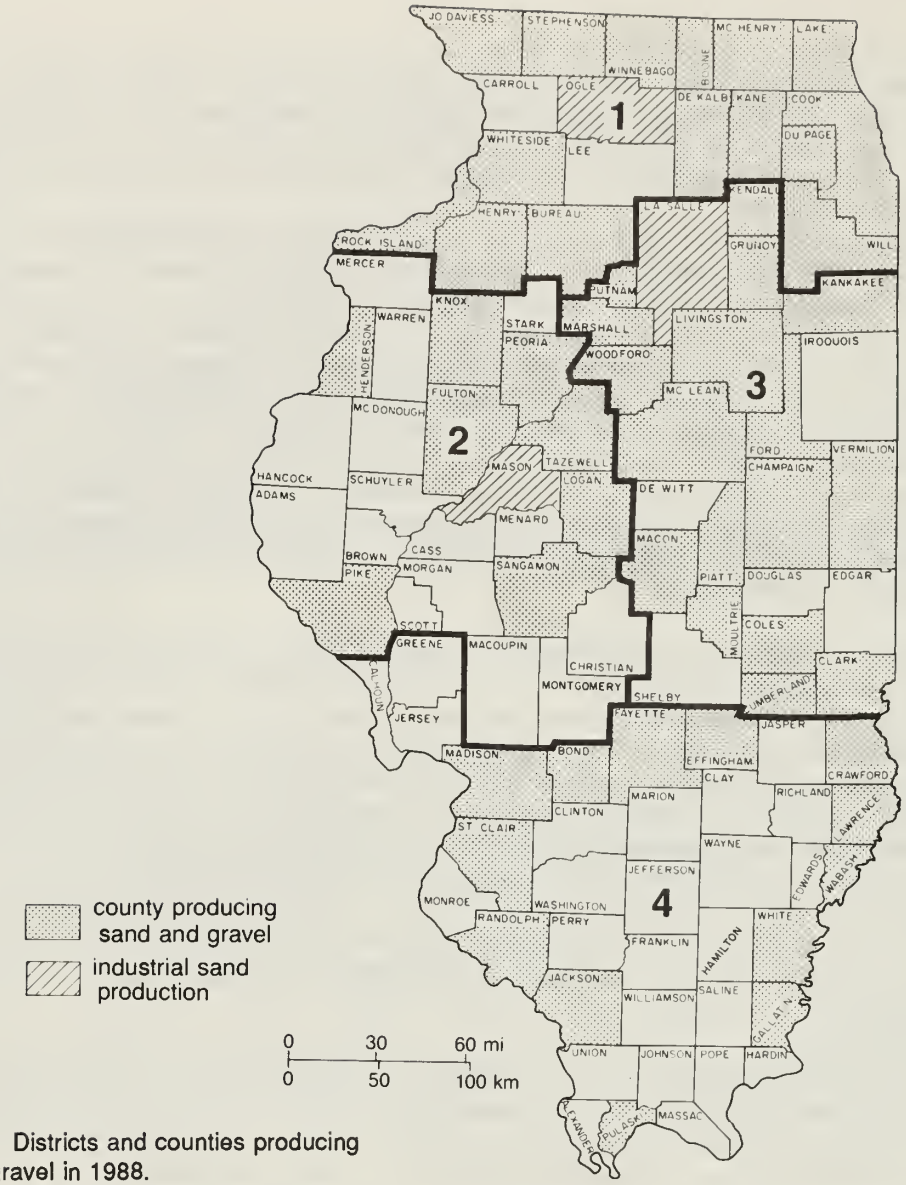

Figure 10 Districts and counties producing sand and gravel in 1988.

Consumption and uses Production reported is actually material sold or used; stockpiled production is not reported until it is sold or consumed. Illinois sand and gravel is primarily used as various types of construction aggregate.

Industrial Sand

Production Illinois continued to rank first of 38 states in the nation in industrial sand production for 1989, accounting for 4.6 million tons (16 percent of the U.S. total). This was a 6-percent increase over 1988. The total value was $52.9 million. The average unit value was estimated at $11.55 per ton, a decrease from $12.97 per ton in 1988—the result of out-of-state competition. Five companies operated seven pits in La Salle, Mason, and Ogle Counties. The area best known for production of industrial sand (silica sand) from the St. Peter Sandstone of Middle Ordovician age is the Ottawa district of La Salle County. Within the district, the St. Peter is referred to as the Ottawa Sand.

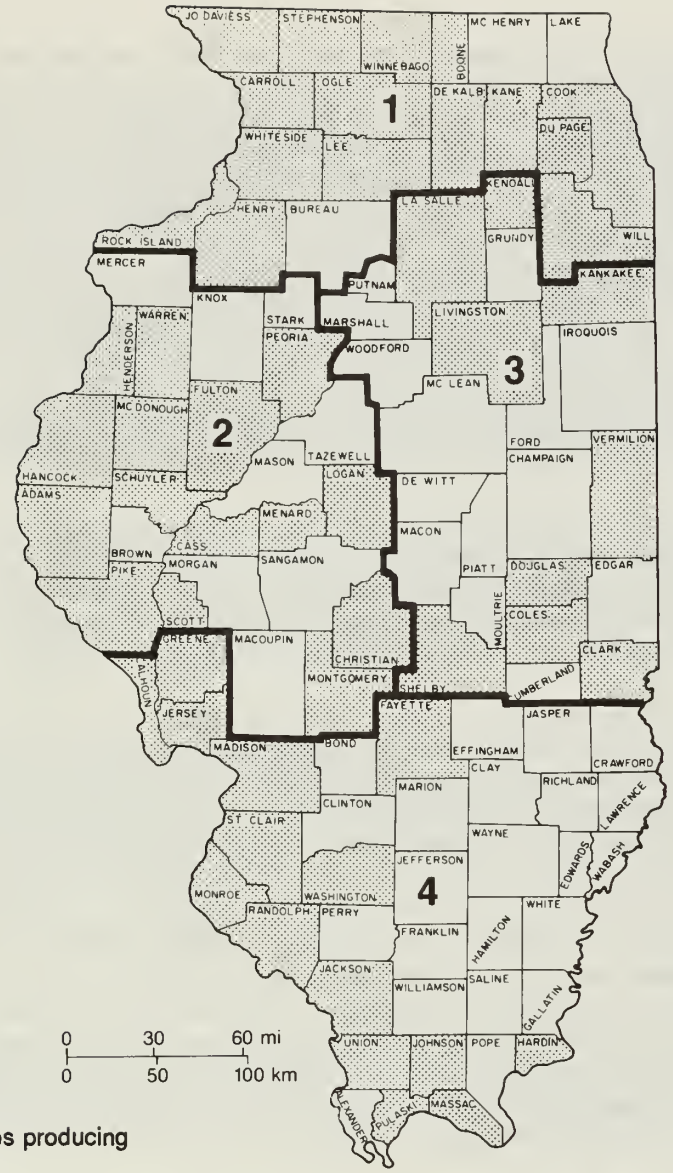

Figure 11 Districts and counties producing stone in 1989 (patterned areas).

Transportation Industrial sand was shipped mainly by rail in 1989, but smaller amounts were shipped by truck and barge. A trend away from trucking has been evident in the past few years, indicating that industrial sand is being shipped longer distances than in the past.

Consumption and uses Industrial silica sand was produced in two forms, ground and unground. Unground sand was used primarily in glass manufacturing. Other uses included molding sand, blasting sand, grinding and polishing sand, railroad traction sand, filtration sand, and propping sand for hydrofracturing reservoir rock in oil wells. Ground sand was used in chemicals, abrasives, enamels, pottery, porcelain, tile, and various fillers.

Stone

Since 1981, the USBM has been surveying stone production only in odd-numbered years. Estimated data are given for 1988 and actual for 1989. In 1985, the USBM began compiling stone production in Illinois by district (fig. 11). Individual county data are no longer available.

Production In production of crushed stone, Illinois ranked fifth among 49 producing states behind Pennsylvania, Florida, Texas, and Virginia. Total Illinois stone production in 1989 was

60.8 million tons, an increase of 5 percent from 1988. The total value was $256.8 million, a gain of about 2 percent. Because of local zoning regulations and land development alternatives, shortages of stone in some urban and industrialized areas are expected. Relocation of stone quarries from centers of population is expected to continue throughout the United States.

In 1989, 54 of the state's 102 counties reported stone production (fig. 10). Crushed stone was produced in 178 quarries by 103 companies (table 19). More than 57 percent of the state's total was produced in District 1; of its total 35 million tons, 71 percent was produced in Cook and Will Counties. Cook County was the largest producer in the state, followed by Will and Hardin Counties. These three counties accounted for more than 46 percent of the state's total production. The 15 largest quarries (each produced more than 900,000 tons per year) accounted for about 58 percent of the total production in 1989, while the 41 smallest producers (less than 25,000 tons per year) accounted for less than 1 percent of the total (table 20). Vulcan Material Company's McCook Quarry and Material Service Corporation's Thornton Quarry ranked as the fourth and eighth largest producers in the nation.

Shipments Stone, a bulk commodity, is used primarily near the quarry; therefore, 57 percent of the stone was transported by truck. About 33 percent was used at the site and the remainder went by barge or rail. Illinois waterways were put to use by some producers along the Illinois, Ohio, and Mississippi Rivers. Crushed stone was barged to in-state destinations as well as to Pennsylvania and Gulf Coast markets in Alabama, Texas, and Louisiana.

Consumption and uses Stone is used principally as construction aggregate, especially as road-base stone, but also for chemical, agricultural, and other purposes (table 21). The small amount of dimension stone mined in Illinois is used as veneer in house construction, small retaining walls, rubble, and flagging. Sales for 1989 were exceptionally good as work continued on Chicago's expressway system and suburban housing projects continued to boom.

Tripoli

Production The term tripoli refers to microcrystalline silica. Two of the nation's leading tripoli producers are located in Alexander County in southern Illinois: Illinois Minerals Company, a division of Georgia Kaolin Company, and Tammsco, a Division of Unimin Corp.

Illinois has remained the nation's largest producer of siliceous materials, accounting for more than half the total U.S. production in 1989. Actual production figures are confidential; however, crude tripoli production in Illinois declined about 11 percent from 1988 to 1989, while value increased for crude production.

Consumption and uses Tripoli processed in Illinois was used as filler in paints, plastics, and rubber products, and as abrasives in buffing and polishing compounds, soap, and toothpaste. Some iron-stained tripoli is now being used in the manufacture of portland cement. Processed material sales and value dropped 16 percent and 9 percent, respectively.

Metals

Zinc, Lead, Silver, and Copper

Production Minerals bearing zinc, lead, silver, and copper were recovered from fluorspar ore mined in Hardin County by Ozark-Mahoning Company. Metallic mineral production in general increased in 1989; only copper production from sulfide concentrate decreased 8 percent, while the per-ton value increased 36 percent from 1988 to 1989. Silver production is not very large, but production increased 120 percent in 1989; however, the price per troy ounce dropped 16 percent. Zinc production increased 18 percent and its value per ton increased 36 percent. Lead production and value increased 12 percent and 6 percent, respectively.

Other Minerals

Peat

The USBM formerly classified peat as a fuel. Because all commercial sales of peat in the United States (excluding imports) are for agricultural and horticultural purposes, peat has been placed in the nonfuel section. Three major kinds of peat—reed sedge, moss, and peat humus—were produced in Illinois by four companies in Lake and Whiteside Counties. Illinois ranked fourth, after Florida, Michigan, and Minnesota, among 22 peat-producing states. Peat production and value dropped 43 and 25 percent, respectively, in 1989. More than 99 percent of the state's total peat was sold in packaged form, almost entirely for general soil improvement. The market for domestic peat started weakening in 1988 and the downturn continued in 1989. In spite of continued housing growth in some local Chicago suburban areas, overall U.S. economic growth slowed, causing a nationwide decline in housing and commercial starts. Recycled yard wastes sold by commercial composting operations also cut into sales of peat.

Gemstones

Because production is limited to specimen-grade fluorite and accessory minerals collected in the fluorspar mines in Illinois, gemstones contributed little to the total value of mineral production. The estimated value of gemstones in 1989 remained at $30,000 after the USBM increased the estimated value in 1988. It had been $15,000 for many years.

MINERALS PROCESSED

This category refers to minerals extracted mainly in other states or foreign countries but processed in Illinois. These include ground barite, columbium and tantalum, calcined gypsum, crude iodine, iron-oxide pigments, natural-gas liquids, expanded perlite, pig iron, sulfur, exfoliated vermiculite, primary slab zinc, and secondary slab zinc. The total value of minerals processed does not show a true picture because the two largest producers of pig iron did not respond to the USBM annual survey and, therefore, no figures are available for pig-iron production in the state.

Ground Barite

Two Illinois companies continued to process ground barite, the Mineral Pigments and Metals Division of Pfizer in St. Clair County and Ozark-Mahoning Company in Hardin County. Illinois-processed ground barite is used almost exclusively as a filler or an extender in paints.

Columbium and Tantalum

Fansteel in Cook County reported processing of columbium-tantalum concentrate imported from foreign countries. In 1989, Fansteel also produced tantalum metal. Columbium and tantalum are used primarily to produce various steel alloys.

Calcined Gypsum

Calcined gypsum, used primarily for prefabricated housing materials such as wallboard, was processed by the National Gypsum Company in Lake County. The gypsum wallboard market has been increasing steadily every year, with more use of gypsum in elevator shaft walls, manufactured (mobile) homes, and the remodeling of homes and offices. Repair and remodeling remained a strong market for the gypsum industry. The production of calcined gypsum in 1989 stayed about the same as in 1988; however, the value decreased about 29 percent. Gypsum from flue-gas desulfurization (sulfo-gypsum) has not entered Illinois markets because of the absence of plants in Illinois generating large quantities of usable gypsum, and because of marketing problems associated with the color and purity of sulfo-gypsum.

Crude Iodine

Crude iodine was processed into inorganic compounds for commercial use at three Illinois plants: Abbott Laboratories in Lake County, Economics Laboratory in Will County, and West Argo-Chemicals in Lake County. Although crude iodine is used primarily as a catalyst or stabilizer, it also is added to animal feed, salt, inks, colorants, pharmaceuticals, and sanitary and industrial disinfectants.

Iron-Oxide Pigments

The finished pigments were produced from iron ore imported from other states by three companies: the Prince Manufacturing Company in Adams County, Pfizer in St. Clair County, and Solomon Grinding Service in Sangamon County.

Natural-Gas Liquids

Natural-gas liquids include ethane, propane, isobutane, unsplit butane, and a combination of gasoline and liquefied petroleum gas. Natural-gas liquids were processed in Douglas County by the U.S. Industrial Chemical Company, a division of Quantum Chemical Corporation. The U.S. Department of Energy reports that Illinois processed 924 Mcf of gas in 1989, 509 Mcf from Illinois and 415 Mcf from out of state. The total liquids extracted from gas in Illinois amounted to 78,000 barrels.

Expanded Perlite

Crude perlite mined outside the state was processed by three companies: Silbrico Corporation in Cook County, Strong-Lite Products Corporation of Illinois in La Salle County, and Manville Products Corporation in Will County. Production of expanded perlite increased 7 percent, while value decreased more than 11 percent. The average price per ton decreased 17 percent in 1989. Expanded perlite is used primarily as roof insulation board and for horticultural purposes. Other uses include aggregate for concrete and plaster, insulation, and filters.

Pig Iron and Raw Steel

Data on pig-iron output for Illinois are not available for 1989. In the United States, pig iron was produced by 16 companies in approximately 70 blast furnaces. Five blast furnaces are in Illinois. Steel-making furnaces located at the same site used most of the pig iron in liquid form for refining raw steel.

The American Iron and Steel Institute in Washington, D.C., ranked Illinois fifth in raw steel production with 7.5 million tons, or 7.7 percent of the U.S. output in 1989. That is down about 3 percent from the 7.76 million tons in 1988. The 1989 production started out strong, then decreased until August and remained about the same for the rest of the year.

Slag (Iron and Steel)

In 1989, Illinois ranked eighth of 12 states in iron slag output and tenth of 25 states in steel slag production. Three companies operating five plants in Alton, Chicago, Granite City, and Sterling processed slag from iron and steel furnaces; three of the plants processed steel slag, one produced both air-cooled and expanded slag, and one produced only air-cooled slag. The slag was used mostly for construction aggregate—road-base material, asphaltic concrete, mineral wool, railroad ballast, and fill. St. Louis Slag Products, Granite City, Illinois, was sold in September 1989 to Lafarge Corporation, based in Reston, Virginia.

Recovered Elemental Sulfur

Four companies in three counties, Crawford, Madison, and Will, recovered elemental sulfur as a byproduct of their oil refinery operations. Sales of sulfur decreased about 2.4 percent from 257,741 tons in 1988 to 251,636 tons in 1989. Total value decreased 2.3 percent from $22.4 million in 1988 to $21.9 million in 1989.

Exfoliated Vermiculite

Exfoliated vermiculite processed from crude vermiculite mined outside the state was produced by two companies in Du Page and La Salle Counties. The state's sales and their value decreased about 4 percent in 1989. However, the average value per ton rose 8 percent. In Illinois, exfoliated vermiculite has the following uses:

	1988 (%)	*1989 (%)*
Loose-fill insulation	16.0	15.7
Block insulation	13.2	12.8
Concrete and plastic aggregate	13.3	13.5
Horticulture and agriculture	14.3	14.8
Fireproofing and other uses	43.2	43.2

Primary and Secondary Slab Zinc

During 1989, secondary slab zinc was processed at Illinois Smelting and Refining Company in Cook County. Production data for individual states are not available. Approximately 200 firms in Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania accounted for about 60 percent of the slab zinc consumption in the U.S.

Eagle Zinc Company at Hillsboro, Illinois is the only domestic producer of oxide by the American process. They plan a 50-percent capacity increase to meet anticipated future zinc oxide market demand. ASARCO Inc., using the French process, has plans to add a new furnace at its Hillsboro plant to increase their production, derived entirely from zinc metal and scrap.

PRODUCTS MANUFACTURED FROM MINERALS

Cement, clay products, coke, glass, and lime were manufactured in 1989 from crude mineral materials mined in and out of state.

Cement

Production Approximately 4.1 million tons of raw materials were used to manufacture cement in Illinois in 1989. The raw materials include cement rock (an argillaceous limestone containing calcium, silica, alumina, and magnesia), limestone, clay, shale, sand, fly ash, slag, gypsum, and tripoli. Four companies produced cement in Illinois: Illinois Cement Company, a subsidiary of Centex Corporation, and Lone Star Industries, both in La Salle County; Dixon-Marquette Cement, a subsidiary of Prairie Materials Sales in Lee County; and Missouri Portland Cement Company, a division of Cementia Oldings AG in Massac County. All four companies produced portland cement, and all except Illinois Cement Company produced masonry cement.

Portland cement sales increased more than 20 percent in 1989. The value per ton decreased 4.2 percent from $44.10 in 1988 to $42.23 in 1989 (table 22). Prepared masonry cement sales declined about 14 percent and the price per ton decreased 16 percent. Nearly all of the cement was delivered by truck in bulk form, although a small amount was shipped by rail and barge.

Consumption Among the cement-consuming states, Illinois ranked fourth behind California, Texas, and Florida. Consumers in Illinois used about 3.7 million tons of portland cement and 97,000 tons of masonry cement in 1989 (fig. 12). These figures represent a 3-percent increase in the use of portland cement and a 2-percent decrease for masonry cement. Cement sales have been outstanding in the Chicago metropolitan area (Cook, Du Page, Kane, Kendall, Lake, McHenry, and Will Counties), with record cement consumption for the past several years. The projects in Chicago for 1989 included a huge concrete building and continuation of work on the city's expressway system. Portland cement consumption increased 5.5 percent in the Chicago metropolitan area, but decreased 1.5 percent in the remaining counties of Illinois. About 85 percent of the portland cement consumed was used by ready-mix

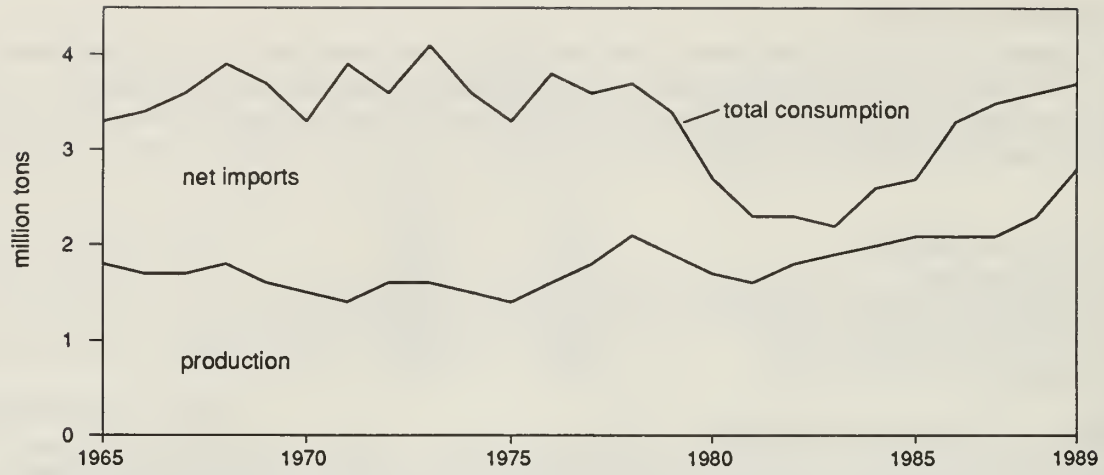

Figure 12 Production and consumption of finished portland cement, 1965-1989.

concrete producers, 6.2 percent by manufacturers of concrete products and building material dealers, and 8.8 percent by government agencies and others for highway construction and related purposes.

Clay Products

To obtain accurate current information about the amount and value of clay products manufactured in Illinois, the Illinois State Geological Survey sends questionnaires every year to all producers in the state.

Clay products were valued at $86.2 million in 1989. Whiteware and pottery decreased from $60.1 million in 1988 to $57.0 million in 1989. All other clay products decreased from $36.1 million in 1988 to $28.9 million in 1989.

Coke

Production All data on coke production in Illinois have been withheld. U.S. production increased 2 percent in 1989. The U.S. Department of Energy no longer provides data on byproducts on a state-by-state basis. The average U.S. price of coal receipts at coke plants in 1989 was $47.50 per ton compared with $47.70 per ton in 1988.

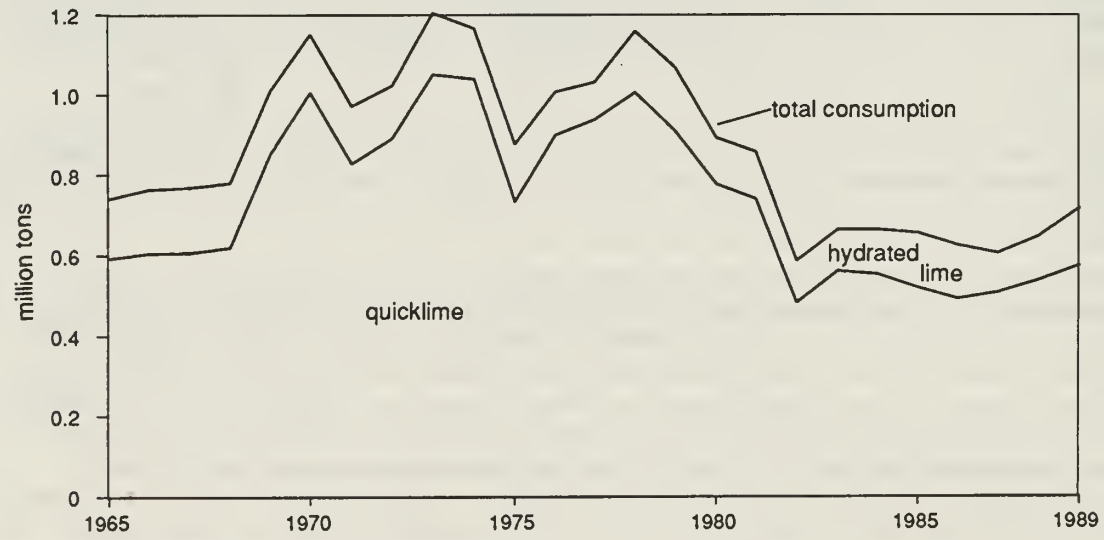

Figure 13 Trends in consumption of quicklime and hydrated lime, 1965-1989.

Consumption and uses Coke is used for pig-iron production, foundry and other industrial purposes, and residential heating. U.S. consumption increased 1.3 percent from 33.5 million tons in 1988 to 33.9 million tons in 1989. Coke breeze was used as fuel in steam and agglomerating plants. State-by-state data on coke breeze are no longer available.

Glass

Glass and/or fiberglass are manufactured in Du Page, Lake, La Salle, Logan, McLean, Macon, Madison, Marion, Montgomery, St. Clair, and Will Counties. Production data are not available.

Lime

Production Illinois ranked seventh of 34 states in producing lime in 1989. Data for lime cannot be disclosed; however, production and value continued to increase (4.2 and 5.5 percent, respectively) as the demand from the steel industry remained high. Three plants in Cook County supplied the state's entire output. Two plants owned by Marblehead Company, a division of General Dynamics, produced quicklime and hydrated lime; and Vulcan Materials Company produced quicklime. Marblehead Company, with two plants in Illinois and one each in Indiana and Michigan, was the third largest of 72 companies producing lime in the United States.

Consumption and uses In 1989, Illinois consumers used 575,000 tons of quicklime, a 6.9-percent increase from 1988, and 144,000 tons of hydrated lime, a 30.9-percent increase (fig. 13). The principal consumer of lime is the steel industry. Lime is used in steel refining to remove impurities. Power plants, municipal water plants, and chemical firms also showed increased use of lime.

PRELIMINARY PRODUCTION DATA: 1990

Minerals Extracted

The total value of minerals mined in 1990 was $2.7 billion, an increase of 6.1 percent from 1989, according to preliminary data (table 23). The higher value can be attributed not only to the higher price for oil, but also to an increase in stone sales. Production increases were also seen in barite, common clay, peat, construction sand and gravel, industrial sand, coal, and zinc. Coal continued to be the leading mineral commodity in Illinois, contributing more than 64 percent to the total value. Oil ranked second, contributing 17 percent, followed by stone, sand and gravel, and industrial sand.

Fuels

Fossil fuel production was valued at about $2.2 billion in 1990, 6 percent higher than in 1989.

Coal The estimated per-ton value of coal in 1990 was $28.20, up slightly from 1989. Coal production was estimated to have increased 2.5 percent to 61.7 million tons in 1990. Nationally, Illinois was again fifth behind Wyoming, Kentucky, West Virginia, and Pennsylvania. Consumption by electric utilities increased during the first 9 months of 1990 (table 24). Coal shipments increased to Indiana, Alabama, Florida, and Tennessee, as well as to in-state users. Decreases were recorded in shipments to Missouri, Wisconsin, Georgia, Iowa, and Mississippi (table 25).

In late 1990, Zeigler Coal Holding Company acquired Old Ben and other U.S. coal properties owned by BP America, Inc. Zeigler Coal Company reopened Old Ben 21 with a life expectancy of 6 to 7 years. It will probably produce coal with greater than 1.5-percent sulfur content.

Crude oil and natural gas Crude-oil production in 1990 is estimated at 19.95 million barrels, a 2-percent decrease (table 23). Production is estimated to have a value of $23.00 per barrel, making the total worth $458.9 million. Oil price per barrel is estimated to have increased by 23 percent over 1989.

Natural-gas production is estimated to have decreased about 2 percent, and value decreased 1.6 percent. The estimated unit value is $2.15 per Mcf in 1990.

Industrial and Construction Materials

The state ranked 17th nationally in the value of nonfuel minerals produced in 1990. Preliminary data for 1990 show an increase of 6.8 percent in total value for industrial and construction materials (data for 1990 do not include an estimate for tripoli). Gains were expected in all commodities except dimension stone and fuller's earth. Dimension stone decreased about 77 percent in production and 73 percent in value. Fuller's earth dropped about 22 percent in production and 17 percent in value. Crushed stone continued to be the leading nonfuel commodity in terms of value, followed by sand and gravel, and industrial sand. Illinois ranked first nationally in production of fluorspar and industrial sand, fourth in crushed stone, and seventh in sand and gravel.

In August 1990, federal legislation was introduced to give Ozark-Mahoning the right to prospect for and mine fluorspar on 3,000 acres of the Shawnee National Forest for 20 years. This will protect fluorspar mining in Hardin County. An amended Abandoned Mined Lands and Water Reclamation Act (AMLWR) will result in the reclamation of 12 fluorspar mines in Hardin and Pope Counties. A contract for $154,000 has been awarded for this project by the state's AMLWR Council.

Metals and Other Minerals

Lead, zinc, copper, silver, and barite continued to be recovered as byproducts of Illinois fluorspar production in 1990. Lead production and value dropped about 96 percent and 95 percent, respectively. Zinc production increased 24 percent and its value, 13 percent in 1990.

Barite production was estimated to have doubled, while its value went up 180 percent. No estimate was given for silver and copper for 1990. Among other minerals, peat production increased 11.1 percent and its value about 13 percent. Illinois ranked seventh nationally among 22 peat-producing states. The output of gemstones remained unchanged over 1989.

Minerals Processed

Preliminary data for 1990 are not yet available for most of the minerals processed in Illinois. The American Iron and Steel Institute reported that Illinois raw steel production increased to 7,607,795 net tons, a 1.2-percent increase over 1989.

Products Manufactured from Minerals

Preliminary figures for 1990 show a decrease of about 3 percent in production and about 1 percent in value of portland cement. Masonry cement production and value both dropped about 88 percent. The decline is blamed on the decrease in housing construction starts, attributed to high interest rates, growing concerns over a slowing economy, and to greater foreign competition. Gradual increases in demand are anticipated as the economy improves. In December 1990, Lafarge Corporation, Reston, Virginia, initiated transactions to acquire various operations of Cementia Holdings AG of Zurich, Switzerland; this would include Missouri Portland Cement Company of Joppa, in Massac County, Illinois. This would make Lafarge the second largest cement producer in the Mississippi River region.

In 1990, lime sales and value decreased by 5 percent. This reversed an upward trend that began in 1986.

Table 1 Illinois minerals extracted, processed, and manufactured into products, 1987–89: production and value[a]

Minerals	Unit	1987 Quantity	1987 Value ($1000)	1987 Average unit[b] value ($)	1988 Quantity	1988 Value ($1000)	1988 Average unit[b] value ($)	1989 Quantity	1989 Value ($1000)	1989 Average unit[b] value ($)
EXTRACTED										
FUELS										
Coal	thousand tons	60,761	1,796,106	29.56	59,852	1,708,786	28.55	60,131	1,693,892	28.17
Crude oil	thousand bbl	24,096	421,685	17.50	22,476	332,422	14.79	20,380	380,693	18.68
Natural gas	million cu ft	1,371	3,071	2.24	1,471	3,221	2.19	1,477	3,175	2.15
TOTAL[d]			2,220,862			2,044,429			2,077,760	
INDUSTRIAL AND CONSTRUCTION MATERIALS										
Clay - common	thousand tons	233	977	4.19	180	704	3.90	157	641	4.09
Sand and gravel										
Common	thousand	28,300[e]	93,300[e]	3.30[e]	30,098	93,504	3.11	33,000[e]	108,900[e]	3.30[e]
Industrial	thousand tons	4,346	45,547	10.48	4,328	56,142	12.96	4,582	52,935	11.55
Stone (limestone & dolomite)										
Crushed & broken	thousand tons	52,102	216,212	4.15	57,900[e]	251,200[e]	4.34[e]	60,829	256,832	4.22
Dimension	thousand tons	W	W	W	1[e]	129[e]	109.75[e]	W	W	W
TOTAL[d]			356,036			401,679			419,308	
Metals, Gemstones and other undisclosed[c]			43,244			46,058			53,822	
Total value of mineral materials extracted[d]		2,620,142			2,492,166			2,550,890		
PROCESSED										
Sulfur	thousand tons	255	26,034	101.72	258	22,367	86.78	252	21,852	86.84
TOTAL[d]			26,034			22,367			21,852	
Values that cannot be disclosed[c]			390,169			48,151			g	
Total value of mineral materials processed[d]			416,203			70,518			21,852	

Table 1 *continued*

Minerals	Unit	1987 Quantity	1987 Value ($1000)	1987 Average unit[b] value ($)	1988 Quantity	1988 Value ($1000)	1988 Average unit[b] value ($)	1989 Quantity	1989 Value ($1000)	1989 Average unit[b] value ($)
MANUFACTERED INTO PRODUCTS										
Cement (shipments)										
Portland	thousand tons	2,119	86,210	40.69	2,307	101,760	44.10	2,776	117,224	42.23
Clay products, estimated			63,070			96,248			86,207	
TOTAL[d]			149,280			198,008			203,431	
Values that cannot be disclosed[c]			40,615			47,217			66,686[g]	
Total value of mineral products manufactured[d]			189,895			245,225			270,117	
STATE TOTAL[d]			$3,226,240			$2,807,909[f]			$2,842,859[f]	

[a] Sources: U.S. Bureau of Mines (USBM), Illinois Department of Mines and Minerals, Illinois State Geological Survey.

[b] Units used for reporting value are 1 barrel for oil, 1000 cubic feet for gas, 1 troy ounce for silver, and 1 ton for all other minerals and materials. Metals are reported in metric tons and other materials in short tons.

[c] Products that cannot be disclosed or are not available:
EXTRACTED, Fuels - natural gas liquids
Industrial and construction materials - absorbent clay, fluorspar, dimension stone, tripoli
Metals - lead, zinc, silver, copper
Other - peat
PROCESSED - Natural gas liquids, expanded perlite, ground barite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, primary slab zinc, secondary slab zinc, columbium and tantalum, crude iodine, slag (iron and steel), pig iron
MANUFACTURED INTO PRODUCTS - Masonry cement, lime, coke, glass

[d] Data may not add up to totals shown because of independent rounding.

[e] Estimate by USBM, no survey.

[f] Does not include pig iron. ISGS estimated value approximately $375 million.

[g] The value of mineral products processed that cannot be disclosed are included in manufactered into products.

W = Withheld to avoid disclosing individual company data.

Table 2 Illinois mineral production compared with U.S. mineral production, 1988–89[a]

Commodity	Unit	Illinois		United States		Illinois % of U.S. production	
		Quantity	Value ($1000)	Quantity	Value ($1,000)	Quantity	Value ($1,000)
1988							
Coal	thousand tons	59,852	1,708,786	946,545	20,890,248	6.32	8.18
Crude oil	thousand bbls	22,476	332,422	2,979,123	37,447,576	0.75	0.89
Natural gas	million cu ft	1,334	2,927	17,841,474	30,170,751	0.01	0.01
Clays[b]	thousand tons	180	704	44,515	1,390,908	0.40	0.37
Sand and gravel[c]	thousand tons	34,426	149,646	951,880	3,081,225	3.62	4.26
Stone (excludes dimension stone)	thousand tons	57,900	251,200	1,247,800	5,558,000	4.64	4.52
Cement shipments (portland)	thousand tons	2,307	101,760	87,183	4,232,814	2.65	2.40
1989							
Coal	thousand tons	60,131	1,693,892	1,035,855	22,602,356	5.80	7.49
Crude oil	thousand bbls	20,380	380,693	2,983,172	47,283,276	0.68	0.81
Natural gas liquids	million cu ft	509	NA	12,080,751	NA	0.004	—
Natural gas	million cu ft	1,477	3,175	18,044,499	30,575,912	0.01	0.01
Clays[b]	thousand tons	157	641	42,254	1,491,475	0.33	0.04
Sand and gravel[c]	thousand tons	37,582	161,835	926,505	3,659,300	4.06	4.42
Stone (includes dimension stone)	thousand tons	60,829	256,832	1,213,400	5,325,800	5.01	4.82
Cement shipments (portland)	thousand tons	2,776	117,224	84,229	4,121,558	3.30	2.84

[a]Sources: U.S. Bureau of Mines, Illinois State Geological Survey, Illinois Department of Mines and Minerals, and American Petroleum Institute.

[b]Excluding fuller's earth.

[c]Includes industrial sand.

NA = not available.

Table 3 Minerals extracted, processed, and manufactured by county in Illinois, 1989[a]

County	Approximate rank based on total value[b]	Minerals extracted in order of value[c]	Minerals processed, in order of value	Mineral products, in order of value
Adams	30	Stone, natural gas, crude oil	Iron oxide pigments[d]	—
Alexander	58	Tripoli, sand/gravel	—	—
Bond	62	Sand/gravel, crude oil, clay	—	—
Boone	78	stone, sand/gravel	—	—
Brown	83	Crude oil	—	—
Bureau	87	Sand/gravel	—	Clay products
Calhoun	96	Stone	—	—
Carroll	91	Stone	—	—
Cass	98	Stone	—	—
Champaign	64	Sand/gravel	—	—
Christian	13	Coal, crude oil, stone	—	—
Clark	48	Crude oil, stone, sand/gravel	—	—
Clay	34	Crude oil	—	—
Clinton	10	Coal, crude oil, natural gas,	—	—
Coles	47	Crude oil, sand/gravel, stone, coal, natural gas	—	—
Cook	5	Stone, sand/gravel	Expanded perlite, slag[d], pig iron[d], secondary slab zinc[d]	Lime, coke[d]
Crawford	16	Crude oil, sand/gravel	Sulfur	Clay products
Cumberland	82	Sand/gravel, crude oil	—	—
De Kalb	61	Stone, sand/gravel	—	—
De Witt	85	Crude oil	—	—
Douglas	28	Coal, stone, crude oil	Natural gas liquids[d]	—
Du Page	43	Stone, sand/gravel	Exfoliated vermiculite	Glass[d]
Edgar	77	Crude oil, natural gas	—	—
Edwards	44	Crude oil	—	—
Effingham	53	Crude oil, natural gas, sand/gravel	—	—
Fayette	33	Crude oil, stone, sand/gravel, natural gas	—	—
Ford	89	Sand/gravel	—	—
Franklin	2	Coal, crude oil	—	—
Fulton	38	Coal, stone, sand/gravel	—	—
Gallatin	12	Coal, crude oil, sand/gravel, natural gas	—	—
Greene	86	Stone	—	—
Grundy	67	Sand/gravel	—	—
Hamilton	50	Crude oil	—	—
Hancock	88	Stone, crude oil	—	—
Hardin	26	Fluorspar, stone, zinc, lead gemstones, sandstone, copper, barite, silver, germanium[d]	Ground/crushed barite[d]	
Henderson	81	Stone, sand/gravel	—	—
Henry	94	Stone, sand/gravel	—	—
Iroquois	99	—	—	—
Jackson	14	Coal, stone, sand/gravel, crude oil	—	—
Jasper	42	Crude oil	—	—
Jefferson	6	Coal, crude oil	—	—
Jersey	95	Stone	—	—
Jo Daviess	76	Stone, sand/gravel	—	—
Johnson	60	Stone	—	—
Kane	24	Sand/gravel, stone, dimension stone	—	Clay products
Kankakee	46	Stone, sand/gravel, clay	—	—
Kendall	65	Stone, sand/gravel	—	—
Knox	31	Sand/gravel	—	Clay products
Lake	39	Sand/gravel, peat	Calcined gypsum, crude iodine[d], columbium[d]	Clay products
La Salle	8	Industrial sand, stone, sand/gravel, clay	Exfoliated vermiculite, expanded perlite	Portland cement, clay products, masonry cement, glass[d]

Table 3 *continued*

County	Approximate rank based on total value[b]	Minerals extracted in order of value[c]	Minerals processed, in order of value	Mineral products, in order of value
Lawrence	18	Crude oil, sand/gravel	—	—
Lee	27	Stone	—	Portland/masonry cement
Livingston	45	Stone, sand/gravel, clay	—	—
Logan	23	Coal, stone, sand/gravel	—	Glass[d]
Macon	59	Sand/gravel, crude oil	—	Glass[d]
Macoupin	11	Coal, crude oil	—	—
Madison	36	Stone, crude oil, sand/gravel	Sulfur, slag[d], pig iron[d]	Clay products, coke[d], glass[d]
Marion	32	Crude oil	Secondary slab zinc[d]	Glass[d]
Marshall	55	Sand/gravel	—	—
Mason	51	Industrial sand	—	—
Massac	17	Stone	—	Portland & masonry cement
McDonough	35	Coal, stone, crude oil	—	Clay products
McHenry	25	Sand/gravel	—	—
McLean	72	Sand/gravel	—	Fiberglass[d]
Menard	71	Stone	—	—
Mercer	100	—	—	—
Monroe	73	Stone, crude oil	—	—
Montgomery	57	Stone, crude oil	—	Glass[d]
Morgan	80	Natural gas, crude oil	—	—
Moultrie	97	Crude oil, sand/gravel	—	—
Ogle	40	Industrial sand, stone	—	—
Peoria	52	Sand/gravel, stone	Slag[d]	—
Perry	1	Coal, crude oil	—	—
Piatt	90	Sand/gravel, crude oil	—	—
Pike	63	Stone, sand/gravel, natural gas	—	—
Pope	101	—	—	—
Pulaski	21	Clay, stone, sand/gravel	—	Clay products
Putnam	92	Sand/gravel	—	—
Randolph	3	Coal, stone, sand/gravel, crude oil, natural gas	—	—
Richland	41	Crude oil	—	—
Rock Island	66	Stone, sand/gravel	—	—
St. Clair	20	Coal, stone, sand/gravel, crude oil, natural gas	Iron-oxide pigments[d], ground barite[d] Primary slab zinc[d]	Glass[d]
Saline	4	Coal, crude oil, natural gas	—	—
Sangamon	69	Sand/gravel, crude oil	Iron-oxide pigments	—
Schuyler	37	Coal, crude oil, stone	—	—
Scott	93	Stone	—	—
Shelby	84	Crude oil, stone	—	—
Stark	102	—	—	—
Stephenson	74	Stone, sand/gravel	—	—
Tazewell	75	Sand/gravel	—	—
Union	54	Stone	—	—
Vermilion	49	Stone, sand/gravel	—	—
Wabash	7	Coal, crude oil, sand/gravel	—	—
Warren	79	Stone	—	—
Washington	15	Coal, crude oil, stone	—	—
Wayne	29	Crude oil, natural gas	—	—
White	9	Coal, crude oil, sand/gravel	—	—
Whiteside	70	Peat, stone, sand/gravel	—	—
Will	22	Stone, sand/gravel	Sulfur, expanded perlite	Glass[d]
Williamson	19	Coal, crude oil, natural gas	—	—
Winnebago	56	Stone, sand/gravel	—	—
Woodford	68	Sand/gravel	—	—
Undistributed		Crude oil	—	—

[a]Sources: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Illinois State Geological Survey.
[b]Since some values are not available by county, ranking cannot be exact.
[c]Sand and gravel production; 1989 data were estimated to rank each county.
[d]Value unknown.

Table 4 Employment and wages in the Illinois mineral industry, 1988–89[a]

Industry	1988				1989			
	No. of employees (1000)	Average weekly earnings ($)	Average hours worked/week	Average hourly earnings ($)	No. of employees (1000)	Average weekly earnings ($)	Average hours worked/week	Average hourly earnings ($)
Mining	21.1	651.84	39.9	16.34	19.8	706.13	42.9	16.46
Bituminous coal	12.3	722.86	39.7	18.21	11.9	793.79	42.7	18.59
Oil and gas extraction	4.0	534.49	38.8	13.77	3.2	571.99	38.7	14.78
Other	4.8	567.63	41.3	13.72	4.7	575.51	46.3	12.22
Processing	61.3	587.11	43.8	13.42	63.8	584.14	44.4	13.15
Primary metal industries	55.1	577.81	44.0	13.13	56.3	572.32	44.4	12.89
Petroleum refining	6.2	669.79	41.9	15.99	7.5	672.84	44.5	15.12
Manufacturing	34.6	502.30	41.7	12.13	36.9	470.12	41.9	11.22
Glass and glass products	6.4	493.07	40.3	12.23	2.7	502.53	41.6	12.08
Cement and clay products	3.4	426.36	41.4	10.30	6.1	515.59	39.6	13.02
Other stone and clay, glass products	16.2	451.84	42.2	10.70	18.5	473.55	41.0	11.55
Petroleum and coal products	8.6	634.23	42.0	15.12	9.6	672.84	44.5	15.12

[a]Source: Illinois Department of Labor, Bureau of Employment Security.

Table 5 Minerals consumed in Illinois, 1988–89[a]

Commodity	Unit	1988			1989		
		U.S.	Illinois	Illinois % of U.S. consumpton	U.S.	Illinois	Illinois % of U.S. consumption
Fuels							
Coal	million tons	883.7	32.9	3.72	889.5	30.1	3.38
Coke	million tons	33.5	NA	—	33.9	NA	—
Distillate fuel oils	million bbl	1,143.0	33.7	2.95	1,152.0	34.6	3.00
Gasoline	million bbl	3,225.0	120.3	3.73	3,228.0	120.2	3.72
Kerosene	million bbl	35.0	0.3	0.85	31.0	0.4	1.28
LPG and ethane	million bbl	606.0	46.6	7.69	609.0	16.0	2.62
Natural gas	trillion cu ft	18.0	1.0	5.36	18.8	1.00	5.28
Residual fuel oil	million bbl	504.0	6.2	1.23	500.0	4.7	0.94
Metals							
Pig iron	million tons	59.0	3.6	6.08	58.4	2.6	4.51
Lead	thousand tons	1,245.2	74.2	5.96	1,283.2	78.7	6.14
Zinc (slab)	thousand tons	829.2	139.8	16.86	869.3	137.6	15.83
Construction materials							
Air-cooled slag	million tons	14.2	NA	—	13.8	NA	—
Asphalt and road oil	million bbl	171.0	5.6	3.28	165.0	8.1	4.88
Cement	million tons	94.0	3.7	3.90	92.6	3.8	4.08
Sand and gravel	million tons	923.4	30.1	3.26	897.3	33.0	3.68
Stone	million tons	1,247.8	57.9	4.64	1,213.4	60.8	5.01
Agricultural and chemical materials							
Feldspar	thousand tons	730.0	29.7	4.07	710.0	27.5	3.87
Fluorspar	thousand tons	551.1	NA	—	641.9	N.A.	—
Lime[b]	thousand tons	17,077.0	648.0	3.79	17,178.0	719.0	4.19
Salt							
Evaporated	thousand tons	7,852.0	469.0	5.97	8,183.0	473.0	5.78
Rock	thousand tons	16,040.0	1,453.0	9.06	16,947.0	1,464.0	8.64

[a]Source: U.S. Bureau of Mines, U.S. Department of Energy.
[b]Excludes regenerated lime.
NA = not available.

Table 6 Fuels and energy consumed in Illinois, 1988–89[a]

Fuel	Units	1988	1989	Change 1988–89 (%)	Trillion Btu[b] 1988[c,e]	Trillion Btu[b] 1989[d]
Coal	thousand tons	32,882	31,116	- 8.4	701.3	640.4
Natural gas	million ft^3	965,388	992,035	+ 2.8	993.4	1,020.8
Gasoline	thousand bbl	120,256	120,176	- 0.1	631.7	631.3
Kerosene	thousand bbl	315	397	+ 26.0	1.8	2.3
Distillate fuel oil	thousand bbl	33,662	34,565	+ 2.7	196.1	201.3
Residual fuel oil	thousand bbl	6,194	4,723	- 23.7	38.9	29.7
Liquid petroleum gases	thousand bbl	46,634	15,984	- 65.7	170.3	58.9
Hydropower	million kWh	65	67	+ 3.1	0.7	0.7
Nuclear power	million kWh	69,166	74,820	+ 8.2	743.1	803.8
TOTAL					3,477.3	3,389.2
Illinois percentage of total U.S. energy consumption					4.5	4.3
Percentage of total energy consumed in Illinois						
Coal					20.17	18.89
Natural gas					28.57	30.12
Oil products					29.87	27.25
Nuclear power					21.37	23.72
Hydropower					0.02	0.02
					100.00	100.00

[a] Source: U.S. Department of Energy, Energy Information Administration.

[b] Fuel conversion factors: gasoline—5,253,000 Btu/bbl; kerosene—5,670,000 Btu/bbl; distillate fuel oil—5,825,000 Btu/bbl; residual fuel oil—6,287,000 Btu/bbl.

[c] 1988 fuel conversion factors: coal—21,327,000 Btu/ton; natural gas—1,029 Btu/Mcf; LPG—3,652,000 Btu/bbl; nuclear power—10,743 Btu/kWh; hydropower—10,253 Btu/kWh.

[d] 1989 fuel conversion factors: coal—21,266,000 Btu/ton; natural gas—1,029 Btu/Mcf; LPG—3,683,000 Btu/bbl; nuclear power—10,743 Btu/kWh; hydropower—10,253 Btu/kWh.

[e] Revised.

Table 7 Coal production in Illinois counties, 1988–89[a]

County	1988 Production					1989 Production				
	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value[b]	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value[b]
Christian[c]	1	1,888,895	—	1,888,895	53,927,952	1	2,049,364	—	2,049,364	57,730,584
Clinton	1	2,987,289	—	2,987,289	85,287,101	1	2,762,147	—	2,762,147	77,809,681
Coles	-	—	—	—	—	1	11,998	—	11,998	337,984
Douglas	1	770,379	—	770,379	21,994,320	1	1,045,088	—	1,045,088	29,440,129
Franklin	4	8,790,972	—	8,790,972	250,982,251	4	7,539,989	—	7,539,989	212,401,490
Fulton	1	—	506,570	506,570	14,462,573	1	—	504,005	504,005	14,197,821
Gallatin	3	1,464,761	560,180	2,024,941	57,812,066	3	1,702,186	531,295	2,233,481	62,917,160
Hamilton	1	42,239	—	42,239	1,205,923	-	—	—	—	—
Jackson	1	—	2,738,233	2,738,233	78,176,552	1	—	2,160,460	2,160,460	60,860,158
Jefferson	2	4,033,354	—	4,033,354	115,152,257	2	3,572,604	—	3,572,604	100,640,255
Logan	1	1,101,933	—	1,101,933	31,460,187	1	1,327,207	—	1,327,207	37,387,421
Macoupin	3	2,629,844	—	2,629,844	75,082,046	2	2,808,596	—	2,808,596	79,118,149
McDonough	1	—	490,101	490,101	13,992,384	1	—	515,813	515,813	14,530,452
Perry	6	—	11,026,514	11,026,514	314,806,975	7	203,790	11,037,541	11,241,331	316,668,294
Randolph	4	4,520,635	1,272,300	5,792,935	165,388,294	4	4,724,923	1,404,000	6,128,923	172,651,761
St. Clair	1	1,149,546	—	1,149,546	32,819,538	1	1,276,779	—	1,276,779	35,966,865
Saline	6	4,493,363	1,142,151	5,635,514	160,893,925	5	4,861,236	1,133,359	5,994,595	168,867,741
Schuyler	1	—	796,289	796,289	22,734,051	1	—	552,269	552,269	15,557,418
Wabash	1	2,909,845	—	2,909,845	83,076,075	1	3,001,455	—	3,001,455	84,550,987
Washington	1	1,621,900	—	1,621,900	46,305,245	1	1,880,500	—	1,880,500	52,973,685
White	1	1,455,291	—	1,455,291	41,548,558	1	1,751,025	—	1,751,025	49,326,374
Williamson[d]	3	23,551	1,436,249	1,459,800	41,677,290	2	8,810	1,764,614	1,773,424	49,957,354
TOTAL	43	39,883,797	19,968,587	59,852,384	1,708,785,563	42	40,527,697	19,603,356	60,131,053	1,693,891,763

[a]Production figures from Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

[b]Value calculated at an average of $28.55/ton for 1988 and $28.17/ton for 1989.

[c]One mine operated at junction of Christian, Montgomery, and Sangamon Counties; all production placed in the county where tipple is located.

[d]One mine operated at junction of Williamson and Saline Counties; all production placed in county where tipple is located.

Table 8 Coal production in Illinois counties, 1833–1989[a]

County	Cumulative total surface production (tons)	Cumulative total production (tons)	County	Cumulative total surface production (tons)	Cumulative total production (tons)
Adams	338,147	341,924	Macoupin	—	326,297,792
Bond	—	7,355,569	Madison	37,843	164,295,772
Brown	41,761	74,068	Marion	—	39,247,722
Bureau	11,094,808	53,823,055	Marshall	4,779	12,516,141
Calhoun	—	96,247	McDonough	3,770,992	6,379,473
Cass	—	212,477	McLean	—	5,544,139
Christian	—	349,663,240	Menard	—	13,462,005
Clark	4,482	4,482	Mercer	67,080	15,519,862
Clay	801	801	Monroe	—	8,284
Clinton	—	68,031,197	Montgomery	—	141,824,660
Coles	—	210,930	Morgan	13,564	190,787
Crawford	17,315	45,400	Moultrie	—	2,032,236
Douglas	—	42,775,874	Peoria	32,702,938	96,718,740
Edgar	207,242	915,698	Perry	360,273,486	459,145,961
Effingham	—	796	Pike	2,224	5,081
Franklin	—	680,626,376	Pope	34,704	36,266
Fulton	239,060,088	315,655,474	Putnam	—	10,071,893
Gallatin	9,647,865	44,093,864	Randolph	100,048,101	218,279,186
Greene	71,090	693,191	Richland	35	154
Grundy	1,635,422	40,872,430	Rock Island	—	3,846,169
Hamilton	—	6,172,927	St. Clair	116,444,567	367,370,806
Hancock	459,329	771,281	Saline	62,149,080	297,114,066
Hardin	—	40	Sangamon	—	233,449,607
Henry	9,065,783	22,910,053	Schuyler	9,137,383	10,840,799
Jackson	60,531,911	128,204,823	Scott	3,790	612,476
Jasper	—	23,739	Shelby	925	4,119,763
Jefferson	5,353,358	153,245,966	Stark	8,342,056	9,569,336
Jersey	2,290	120,350	Tazewell	—	17,633,802
Johnson	72,781	314,325	Vermilion	30,651,670	165,878,433
Kankakee	18,284,342	19,192,105	Wabash	12,082	34,540,139
Knox	62,601,174	65,896,605	Warren	132	685,466
La Salle	2,345,878	65,547,638	Washington	—	31,108,137
Livingston	139,091	10,111,437	White	—	8,732,227
Logan	—	21,167,390	Will	29,333,708	37,553,733
Macon	—	11,000,468	Williamson	100,105,015	457,047,410
			Woodford	—	7,810,160

Total cumulative surface production, 1911–1989	1,274,111,112	Estimated production, all counties, 1833–1881	73,386,123
Total cumulative production, 1882–1989	5,309,660,923	Total cumulative production, 1833–1989	5,383,047,046

[a]Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Reports. This table has been revised with production placed in county where tipple is located.

Table 9 Employment and production by method of coal mining in Illinois, 1978–89[a]

Year	Underground				Surface			
	No. of mines	No. of employees	Average production/ mine (tons)	Average no. employees/ mine	No. of mines	No. of employees	Average production/ mine (tons)	Average no. employees/ mine
1978	28	12,620	888,914	451	43	5,241	554,757	122
1979	31	13,200	1,054,233	426	40	5,299	671,422	132
1980	31	13,219	1,128,022	426	35	5,065	787,821	145
1981	31	13,351	943,081	431	27	4,797	835,672	178
1982	32	10,554	1,115,121	330	28	4,397	919,439	157
1983	31	10,514	1,076,464	339	23	4,245	1,087,096	185
1984	31	10,857	1,288,564	350	21	3,946	1,206,843	188
1985	32	11,386	1,207,769	356	20	3,445	1,091,432	172
1986	31	10,379	1,320,375	335	20	3,170	1,115,084	159
1987	28	9,263	1,399,588	331	19	2,925	1,135,416	154
1988	27	8,830	1,477,178	327	16	2,684	1,248,037	168
1989	27	8,729	1,501,026	323	15	2,376	1,306,890	158

[a]Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

Table 10 Coal production of Illinois companies, 1988–89[a]

		1988					1989					
		No. of mines					No. of mines					
Rank	Company	Under-ground	Surface	Production (tons)	Percentage of total production	No. of employees	Rank	Under-ground	Surface	Production (tons)	Percentage of total production	No. of employees
1	Consolidation Coal	2	3	9,267,916	15.48	1,114	2	1	3	7,935,943	13.20	969
2	Old Ben Coal	4	0	8,790,972	14.69	1,534	3	4	0	7,539,989	12.54	1495
3	Peabody Coal	5	1	8,726,403	14.58	2,099	1	5	1	9,804,305	16.31	2,133
4	Arch of Illinois	0	3	6,909,107	11.54	895	4	0	3	7,126,873	11.85	841
5	Monterey Coal	2	0	4,715,303	7.88	1,145	6	2	0	4,588,939	7.63	1,077
6	AMAX Coal	2	1	4,503,193	7.52	1,051	5	1	1	4,766,069	7.93	1,035
7	Zeigler Coal	3	0	3,585,157	5.99	555	7	3	0	3,860,611	6.42	537
8	Freeman United Coal Mining	2	2	3,055,248	5.10	920	8	2	2	3,205,406	5.33	827
9	Kerr-McGee Coal	1	0	2,471,963	4.13	556	9	1	0	2,843,124	4.73	580
10	White County Coal	1	0	1,455,291	2.43	237	10	1	0	1,751,025	2.91	253
11	Sahara Coal	1	1	1,203,026	2.01	443	13	1	1	1,108,521	1.84	372
12	Kenellis Energies	1	0	1,171,947	1.96	250	11	1	0	1,420,683	2.36	268
13	Turris Coal	1	0	1,101,933	1.84	280	12	1	0	1,327,207	2.21	270
14	Triad Mining[b]	0	1	796,289	1.33	114	15	0	1	552,269	0.92	43
15	Jader Coal	0	1	560,180	0.94	73	16	0	1	531,295	0.88	79
16	Equality Mining	0	1	555,820	0.93	42	14	0	1	622,267	1.03	43
17	Midland Coal[c]	0	1	506,570	0.85	104	17	0	1	504,005	0.84	100
18	Arclar Company	1	0	376,856	0.63	80	18	1	0	417,924	0.70	55
19	Ace Diggin, Inc.	0	1	75,659	0.13	16	—	—	—	—	—	—
20	Lorenzo Mining	1	0	23,551	0.04	6	21	1	0	8,810	0.01	1
—	Amco-Illinois Mining	—	—	—	—	—	20	1	0	11,998	0.02	10
—	Cutler Mining	—	—	—	—	—	19	1	0	203,790	0.34	117
	TOTAL	27	16	59,852,384	100.0	11,514		27	15	60,131,053	100.0	11,105

[a]Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.
[b]Was Black Beauty; now Triad Mining.
[c]Was Midland Coal; now Mid State Coal.

Table 11 Coal shipped from Illinois to other states, 1985–89

Consumers	Wisconsin	Minnesota & Michigan	Iowa	Missouri	Indiana	Kentucky (1,000 tons)	Georgia & Florida	Other states[b]	Exports and miscellaneous	Illinois	Total
Electric utilities											
1985	1,216	269	1,959	13,419	7,653	117	6,854	4,840	—	16,541	52,899
1986	1,523	123	2,045	12,824	9,130	847	6,318	6,028	—	16,822	55,659
1987	1,757	296	1,621	12,945	9,282	61	9,140	2,364	—	15,909	53,375
1988	2,058	79	2,217	12,871	7,871	136	9,791	2,951	—	14,372	52,344
1989	1,359	57	2,072	13,109	8,247	424	9,055	4,163	—	14,911	53,397
Coke and gas plants											
1985	—	—	—	—	1,292	—	—	—	—	715	2,006
1986	—	—	—	10	1,536	—	—	—	—	281	1,827
1987	—	—	—	—	1,531	—	—	—	—	294	1,826
1988	—	—	—	—	1,414	—	—	e	—	94	1,508
1989	—	—	—	—	1,116	—	—	—	—	425	1,541
Retail dealers											
1985	—	—	14	89	1	—	—	e	24	186	309
1986	3	e	2	47	1	—	—	e	—	201	273
1987	—	—	11	44	4	—	—	17	—	200	291
1988	—	—	e	45	e	—	—	33	—	197	285
1989	—	—	e	228	e	—	—	16	—	217	471
Others											
1985	624	53	412	780	317	9	—	50	40	1,553	3,838
1986	341	46	177	835	204	—	—	186	7	1,692	3,530
1987	287	31	389	754	269	—	—	91	—	2,211	4,063
1988	260	7	313	740	223	—	—	120	7	2,587	4,270
1989	290	—	290	619	145	1	—	140	16	2,005	3,510
Totals[c]											
1985	1,872	322	2,385	14,288	9,262	125	6,854	4,889	117[d]	18,995	59,171[d]
1986	1,867	169	2,224	13,716	10,871	847	6,318	6,213	202[d]	18,996	61,493[d]
1987	2,044	326	2,020	13,743	11,087	61	9,140	2,472	345[d]	18,614	59,899[d]
1988	2,317	85	2,530	13,656	9,508	136	9,791	3,104	494[d]	17,250	58,901[d]
1989	1,649	57	2,362	13,956	9,508	424	9,055	4,319	488[d]	17,558	59,464[d]

[a] Sources: U.S. Department of Energy, Coal Distribution, 1984–1988.

[b] Includes AL (1985–1989), MS (1985–89), TN (1985–89), LA (1985–87,89), OH (1986–89[e]), PA (1986,89[e], 87–88), KS (1985–88), TX (1985–88), CA (1985–88), AR (1985–88), WV (1985[e]), MA (1986[e]–88[e]), ND (1986[e]), MT (1987[e]).

[c] Totals may not add up because of independent rounding.

[d] Includes shipments to foreign countries, with no breakdown by consuming sector: 44,000 tons foreign and 9,000 tons U.S. in 1985, 195,000 tons in 1986, 343,000 tons foreign, 2,000 U.S. in 1987, 487,000 tons in 1988, 472,000 tons in 1989.

[e] Quantity is less than 500 tons.

Table 12 Sources of coal consumed in Illinois, 1985–89[a]

Consumers	Illinois	Western Kentucky	Indiana	Ohio, eastern Pennsylvania,[b] and northern West Virginia	Southern West Virginia,[c] Virginia, and eastern Kentucky	Western interior[d] states	Western states[e]	Montana[f] and Washington	Pennsylvania	Total coal consumed in Illinois
					(1,000 tons)					
Electric utilities										
1985	16,541	1,116	1,310	—	1,272	—	8,186	3,258	g	31,682
1986	16,822	1,147	1,313	12	1,431	—	7,198	4,277	—	32,200
1987	15,909	1,154	1,427	—	1,849	—	5,608	3,500	4	29,452
1988	14,372	1,102	1,150	—	1,630	—	4,777	3,876	g	26,908
1989	14,911	111	2,012	7	1,716	—	3,555	2,880	—	25,192
Coke and gas plants										
1985	715	—	4	210	1,139	—	—	—	—	2,068
1986	281	—	—	146	1,527	—	—	—	—	1,954
1987	294	—	—	—	1,344	—	—	—	—	1,638
1988	94	—	—	—	1,312	—	—	—	—	1,406
1989	425	—	—	—	1,288	—	—	—	—	1,714
Retail dealers										
1985	186	12	30	—	8	—	—	—	1	236
1986	201	5	30	g	9	—	—	—	g	245
1987	200	1	49	—	22	—	g	—	1	273
1988	197	7	44	—	7	—	—	—	1	256
1989	217	21	29	—	30	—	—	—	—	298
Others										
1985	1,553	315	499	30	601	—	—	—	36	3,035
1986	1,692	577	499	5	918	—	—	—	33	3,690
1987	2,211	528	356	68	820	1	—	—	25	3,999
1988	2,587	387	647	21	659	g	—	—	10	4,311
1989	2,005	238	234	27	395	6	—	g	8	2,913
Total										
1985	18,995	1,443	1,843	240	3,020	—	8,186	3,258	37	37,022
1986	18,996	1,738	1,842	162	3,886	—	7,198	4,277	33	38,089
1987	18,614	1,683	1,832	68	4,025	1	5,608	3,500	30	35,362
1988	17,250	1,496	1,841	21	3,609	g	4,777	3,876	11	32,882
1989	17,558	370	2,275	34	3,429	6	3,555	2,880	10	30,116

[a]Sources: U.S. Department of Energy, Coal Distribution.
[b]Includes Districts 1, 2, 3, 4, and 6 (MD, OH, eastern PA, northern WV).
[c]Includes Districts 7, 8, and 13 (AL, GA, eastern KY, NC, TN, VA, southern WV).
[d]Includes Districts 14 and 15 (AR, KS, MO, OK, TX).
[e]Includes Districts 16, 17, and 19–21 (CO, ID, ND, NM, SD, UT, WY).
[f]Includes Districts 22 and 23 (AK, MT, OR, WA).
[g]Quantity is less than 500 tons.

Table 13 Crude-oil production in Illinois counties between 1888 and 1989; value for 1988 and 1989[a]

County	1888–1989 cumulative production (1000 bbl)	1988 Production (1000 bbl)	1988 % of total Illinois production	1988 Value[d] ($1000)	1989 Production (1000 bbl)	1989 % of total Illinois production	1989 Value[d] ($1000)	1988–89 percent change
Adams	281	4	0.0	60	2	0.0	37	- 51.4
Bond	8,121	62	0.3	922	59	0.3	1,110	- 4.7
Brown	2,078	99	0.4	1,467	53	0.3	983	- 47.0
Champaign	7	—	—	—	—	—	—	—
Christian	29,955	377	1.7	5,579	292	1.4	5,452	+ 22.6
Clark-Cumberland	94,466	210	0.9	3,110	240	1.2	4,484	+ 14.2
Clay	148,644	1,092	4.9	16,150	1,009	5.0	18,845	- 7.6
Clinton	88,230	262	1.2	3,875	242	1.2	4,523	- 7.6
Coles	25,128	166	0.7	2,455	144	0.7	2,686	- 13.4
Crawford	251,524	2,195	9.8	32,467	2,040	10.0	38,100	- 7.1
De Witt	3,789	49	0.2	722	49	0.2	924	+ 1.4
Douglas	3,669	2	0.0	27	2	0.0	46	+ 33.1
Edgar	4,607	60	0.3	889	62	0.3	1,166	+ 3.9
Edwards	56,797	579	2.6	8,566	531	3.1	9,926	- 8.3
Effingham	19,828	270	1.2	3,989	228	1.1	4,263	- 15.4
Fayette	411,046	1,222	5.4	18,070	991	4.9	18,509	- 18.9
Franklin	81,139	947	4.2	14,010	779	3.8	14,560	- 17.7
Gallatin	55,755	311	1.4	4,596	300	1.5	5,606	- 3.4
Hamilton	137,984	310	1.4	4,583	299	1.5	5,591	- 3.4
Jackson	104	5	0.0	78	4	0.0	79	-25.4
Jasper	60,631	616	2.7	9,112	615	3.0	11,484	- 0.2
Jefferson	94,599	1,011	4.5	14,956	964	4.7	18,010	- 4.7
Lawrence	423,028	2,911	13.0	43,046	2,806	13.8	52,424	- 3.6
Macon	2,564	76	0.3	1,124	68	0.3	1,276	-10.1
Macoupin	388	12	0.1	179	9	0.0	174	- 23.0
Madison	18,690	97	0.4	1,427	80	0.4	1,485	- 17.6
Marion	434,160	1,326	5.9	19,607	1,116	5.5	20,856	- 15.8
McDonough-Hancock[c]	5,694	1	0.0	18	3	0.0	61	+171.1
Monroe	107	13	0.1	184	17	0.1	323	+ 38.3
Montgomery	159	3	0.0	36	3	0.0	49	+ 7.3
Morgan	2	f	0.0	4	1	0.0	12	+123.2
Moultrie	134	3	0.0	44	3	0.0	59	+ 7.6
Perry	948	8	0.0	113	7	0.0	138	- 3.1
Piatt	8	f	0.0	2	f	0.0	6	+ 98.8
Randolph	4,994	15	0.1	219	11	0.1	208	- 25.1
Richland	111,918	626	2.8	9,254	677	3.3	12,653	+ 8.3
St. Clair	3,640	21	0.1	313	20	1.4	369	- 6.6
Saline	24,651	266	1.2	3,931	295	0.2	5,511	+ 11.0
Sangamon	5,128	103	0.5	1,524	50	0.1	943	- 51.0
Schuyler	207	16	0.1	235	16	0.2	300	+ 1.0
Shelby	2,216	49	0.2	729	50	0.1	929	+ 0.8
Wabash	120,814	1,150	5.1	17,014	1,027	5.0	19,189	- 10.7
Washington	35,873	340	1.5	5,032	383	1.9	7,147	+ 12.4
Wayne	276,033	1,740	7.7	25,742	1,550	7.6	28,959	- 10.9
White	316,179	2,094	9.3	30,974	1,840	9.0	34,366	- 12.2
Williamson	2,752	26	0.1	389	37	0.2	698	+ 42.1
Other[b]	16,609	1,731	7.7	25,597	1,401	6.9	26,175	- 19.0
Total[e]	3,385,268	22,476	100.0	332,420	20,380	100.0	380,693	- 9.3

[a] Source: Illinois State Geological Survey Oil and Gas Section
[b] Could not be assigned to individual field or county.
[c] No oil production reported for Hancock County in 1971–1978; 120 bbl was produced in 1988 and 327 bbl in 1989.
[d] Value calculated at an estimated average price of $14.79 per barrel for 1988 and $18.68 per barrel for 1989.
[e] May not add up because of independent rounding.
[f] Less than 1,000 bbl.

Table 14 Crude-oil production from major fields (over 200,000 barrels per year) in Illinois, 1988–89[a]

Field	County	1988 Production (1000 bbl)	1988 % of Ill. total	1989 Production (1000 bbl)	1989 % of Ill. total	1988–89 Change (%)
Lawrence	Lawrence Crawford	2,851.0	12.7	2,761.6	13.6	- 3.1
Clay City Consolidated	Clay Wayne Richland Jasper	2,109.2	9.4	2,228.0	10.9	+ 5.6
Main Consolidated	Crawford Lawrence Jasper	2,144.0	9.5	1,988.1	9.8	- 7.3
Louden	Fayette Effingham	1,243.5	5.5	953.5	4.7	- 23.3
Salem	Marion Jefferson	1,247.9	5.6	947.6	4.6	- 24.1
New Harmony Consolidated	White Wabash Edwards	1,006.1	4.5	913.0	4.5	- 9.3
Sailor Springs Consolidated	Clay Jasper Effingham	545.1	2.4	486.0	2.4	- 10.8
Phillipstown Consolidated	White Edwards	431.1	1.9	378.2	1.9	- 12.3
Allendale	Wabash Lawrence	337.3	1.5	281.7	1.4	- 16.5
Albion Consolidated	Edwards White	311.9	1.4	285.5	1.4	- 8.5
King North	Jefferson	b	—	255.9	1.3	-
Roland Consolidated	White Gallatin	252.6	1.1	254.2	1.2	+ 0.6
Herald Consolidated	White Gallatin	256.8	1.1	220.9	1.1	- 14.0
Parkersburg	Edwards Richland	b	—	214.7	1.1	—
Benton	Franklin	235.5	1.0	204.7	1.0	- 13.1
Johnsonville Consolidated	Wayne	285.4	1.3	b	—	—
Storms Consolidated	White	284.9	1.3	b	—	—
		13,542.2	60.3	12,373.6	60.7	- 8.6

[a]Source: Illinois State Geological Survey Oil and Gas Section.
[b]Less than 200,000 barrels of oil per year.

Table 15 Petroleum products consumed in Illinois, 1985–89[a]

	1985[d]	1986[d]	1987[d] (1,000 bbl)	1988[d]	1989
Motor gasoline[b]	114,047	110,906	112,409	120,344	120,176
Kerosene	1,148	409	267	315	397
Distillate fuel oil	32,189	35,132	34,129	33,662	34,565
Residual fuel oil	7,250	9,156	7,127	6,194	4,723
Lubricants	3,160	3,090	3,493	3,369	3,455
Liquefied gases	33,891	36,627	42,328	46,634	15,984
Asphalt & road oil	7,500	6,185	6,315	5,604	8,052
Other[c]	19,838	23,476	25,314	28,072	27,942
Total	219,019	224,981	231,382	244,194	215,294

[a] Source: State Energy Data Report, U.S. DOE/EIA-0214.
[b] Aviation and motor gasoline and jet fuel.
[c] Includes natural gasoline, unfractionated stream, plant condensate, petrochemical feedstocks, special naphthas, non-electric utility sector use of petroleum coke, still gas, wax, unfinished oils, motor gasoline and aviation gasoline blending components, and miscellaneous products.
[d] Revised.

Table 16 Natural-gas production in Illinois, 1982–89[a]

	Withdrawals (million cu ft)		
Year	Gas wells	Oil wells	Total
1982	993.5	168.5	1,162
1983	858.0	172.0	1,030
1984	1,399.6	130.4	1,530
1985	1,228.0	96.0	1,324
1986	1,545.9	341.6	1,888
1987	1,215.2	155.8	1,371
1988	1,289.5	181.2	1,471
1989	1,268.0	209.0	1,477

[a] Source: Illinois State Geological Survey Oil and Gas Section.

Table 17 Natural-gas production from large fields in Illinois counties, 1987–89[a]

Gas field	County	Production (million cu ft)			Change (%)	
		1987	1988	1989	1987–88	1988–89
Liberty	Adams	—	132.8	188.6	—	+ 41.9
Stolletown	Clinton	167.7	75.6	43.1	- 54.9	- 43.0
Mattoon	Coles	315.0	226.9	148.7	- 28.0	- 34.5
Ashmore East	Edgar	57.5	56.9	47.8	- 1.0	- 15.9
Prentice	Morgan	165.0	505.6	549.1	+ 206.4	+ 8.6
Fishhook	Pike	202.1	136.5	151.2	- 32.4	+ 10.8
St. Libory	St. Clair	—	—	56.5		
Raleigh South	Saline	59.4	57.9	33.7	- 2.6	- 41.8
Rushville	Schuyler	119.9	2.0	—	- 98.3	—
Keenville	Wayne	141.2	170.4	199.3	+ 20.7	+ 17.0
Other[b]		143.2	106.0	58.9	- 25.9	- 44.4
TOTAL[c]		1,371.0	1,470.7	1,476.9	+ 7.3	+ 0.4

[a] Source: Illinois State Geological Survey. Fields producing 50 million cu ft or more.
[b] Louden, Fayette and Effingham Counties; Eldorado East, Gallatin County; Eden, Randolph County; Eldorado Consolidated and Eldorado West, Saline County; Pittsburg, Williamson County (1987, 1988, 1989); Waggoner, Montgomery County (1987); New Athens and St. Libory, St. Clair County (1987, 1988).
[c] Totals may not add up because of rounding.

Table 18 Natural gas consumed in Illinois, 1988–89[a]

Consumers	1988		1989		1988–89 change (%)
	Quantity (million cu ft)	% of total consumption	Quantity (million cu ft)	% of total consumption	
Residential	462,339	47.9	496,487	50.0	+ 7.4
Commercial	215,257	22.3	196,133	19.8	- 8.9
Industrial	269,226	27.9	278,826	28.1	+ 3.6
Electric utilities	5,706	0.6	6,967	0.7	+22.1
Total delivered to consumers	952,529	98.7	978,413	98.6	+ 2.7
Other uses[b]	12,859	1.3	13,622	1.4	+ 5.9
Total consumption	965,388	100.0	992,035	100.0	+ 2.8

[a] Source: U.S. Department of Energy.
[b] Includes lease and plant fuel, pipeline fuel, and extraction loss.

Table 19 Production and value of Illinois stone by district,[a] 1989[b]

County			Companies[c]	Operations	Total quantity (1000 ton)	Value ($1000)
District 1						
Boone	Henry	Rock Island				
Carroll	Jo Daviess	Stephenson				
Cook	Kane	Whiteside	55	89	34,950	134,651
De Kalb	Lee	Will				
Du Page	Ogle	Winnebago				
District 2						
Adams	Henderson	Peoria				
Cass	Logan	Pike				
Christian	McDonough	Schuyler	27	33	4,959	41,359
Fulton	Menard	Scott				
Hancock	Montgomery	Warren				
District 3						
Clark	Kankakee	Livingston				
Coles	Kendall	Shelby	20	23	8,967	36,971
Douglas	La Salle	Vermilion				
District 4						
Calhoun	Jersey	Pulaski				
Fayette	Johnson	Randolph				
Greene	Madison	St. Clair	28	33	11,953	43,851
Hardin	Massac	Union				
Jackson	Monroe	Washington				
	Total		103[c]	178	60,829	256,832

[a] See figure 9.
[b] Source: U.S. Bureau of Mines.
[c] This column does not total as some companies have operations in more than one county.

Table 20 Illinois stone production by size of operation, 1987 and 1989[a]

Size of operation (tons/years)	1987			1989		
	No. of quarries	Production[a] (tons)	Percent of total	No. of quarries	Production[b] (tons)	Percent of total
less than 25,000	51	561,290	1.1	41	393,417	0.7
25,000 to 49,999	23	823,760	1.6	24	869,136	1.4
50,000 to 74,999	30	1,881,112	3.6	13	742,740	1.2
75,000 to 99,999	11	967,247	1.9	10	862,321	1.4
100,000 to 199,999	23	3,300,780	6.3	29	4,131,452	6.8
200,000 to 299,999	26	6,555,433	12.6	20	4,948,627	8.1
300,000 to 399,999	3	1,065,353	2.0	7	2,325,606	3.8
400,000 to 599,999	7	2,827,048	5.4	9	4,397,196	7.2
600,000 to 699,999	6	3,878,071	7.4	5	3,269,602	5.4
700,000 to 799,999	5	2,810,059	7.3	5	3,818,583	6.3
800,000 to 899,999	4	3,360,449	6.5	0	—	—
900,000 and over	11	23,072,820	44.3	15	35,069,945	57.7
Total	199	52,102,422	100.0	178	60,828,625	100.0

[a] Source: U.S. Bureau of Mines. Due to the canvassing procedure used for stone production, 1988 information will not be available.
[b] Excludes dimension stone.

Table 21 Use of crushed and broken stone produced in Illinois, 1987 and 1989[a]

Use	1987 Total (tons)	1987 % of total	1985–87 change (%)	1987 Average value/ton	1989 Total (tons)	1989 % of total	1987–89 change (%)	1989 Average value/ton
Road-base stone	12,294,572	23.6	+44.4	3.60	12,088,821	19.9	- 1.7	3.64
Concrete aggregate	4,767,729	9.2	+41.4	3.96	6,111,095	10.0	+28.2	4.07
Surface-treatment aggregate	1,778,020	3.4	+58.8	5.16	1,047,859	1.7	-41.1	4.32
Bituminous aggregate	3,940,129	7.6	+27.0	4.49	3,626,942	6.0	- 7.9	4.84
Unspecified construction	3,350,789	6.4	+47.2	3.69	4,706,766	7.7	+40.5	3.76
Agricultural purposes[b]	4,638,760	8.9	+46.6	3.48[d]	4,162,616	6.8	-10.3	3.32[d]
Cement	1,762,387	3.4	-31.6	2.84	2,979,264	4.9	+69.0	3.25
Macadam aggregate	750,882	1.4	-53.6	4.09	864,841	1.4	+15.2	4.10
Flux stone	W[c]	—	+ 2.6	4.33	W[c]	—	- 0.5	3.90
Riprap and jetty	677,249	1.3	-23.6	5.66	642,109	1.1	- 5.2	5.32
Railroad ballast	574,533	1.1	-41.4	4.06	233,772	0.4	-59.3	4.42
Other uses[c]	17,567,372	33.7	+30.7	4.63	24,364,540	40.1	-38.7	4.75
Total	52,102,422	100.0	+26.9	4.15	60,828,625	100.0	+16.7	4.22

[a] Source: U.S. Bureau of Mines. Due to the new reporting procedure implemented for stone, 1988 figures will not be available.
[b] Includes agricultural limestone and poultry grit.
[c] Includes stone for asphalt filler, chemicals, lime manufacture, mine dusting, filler, roofing aggregate, fill, waste material, whiting, other uses, and flux.
[d] Average value per ton for ag lime.
W = Withheld to avoid disclosing individual company confidential data.

Table 22 Portland cement manufactured in Illinois, 1988–89[a]

	1988	1989	Change (%) 1988–89
No. of active plants	4	4	—
Production (tons)	2,032,647	2,700,192	+ 32.8
Shipments from mills			
Quantity (tons)	2,307,411	2,775,813	+ 20.3
Value ($)	101,759,933	117,223,528	+ 15.2
Average value/ton	44.10	42.23	- 4.2
Stocks at mills, Dec. 31 (tons)	195,502	283,450	+ 45.0

[a] Source: U.S. Bureau of Mines.

Table 23 Mineral production data for 1989 compared with preliminary data for 1990[a]

		1989		1990		Percentage of change from 1989 to 1990	
Minerals extracted	Unit	Quantity	Value ($ 1000)	Quantity	Value ($ 1000)	Quantity	Value
Fuels							
Coal	thousand tons	60,131	1,693,892	61,656	1,738,702[b]	+ 2.5	+ 2.6
Crude oil	thousand bbl	20,380	380,693	19,950[b]	458,850[b]	- 2.1	+ 20.5
Natural gas	thousand Mcf	1,477	3,175	1,446[b]	3,124[b]	- 2.1	- 1.6
Industrial and construction materials							
Stone[c]	thousand tons	60,829	256,832	63,800	283,100	+ 4.9	+ 10.2
Sand and gravel	thousand tons	37,582	161,835	38,350	171,500	+ 2.0	+ 6.0
Clay[d]	thousand tons	157	641	599	2,516	+281.5	+292.5
Metals, gemstones and other undisclosed[e]		53,822		41,235		- 23.4	
Total value of minerals extracted			$2,550,890		$2,699,027		+ 5.8

[a] Source: U.S. Bureau of Mines and Illinois Department of Mines and Minerals
[b] Estimated by Illinois State Geological Survey
[c] Dimension stone included with values that cannot be disclosed.
[d] Excludes fuller's earth; included with values that cannot be disclosed.
[e] Includes fluorspar, tripoli, lead, zinc, silver, copper, barite, peat, gemstones, fuller's earth, and dimension stone for 1989 and 1990.

Table 24 Illinois coal shipped to consumers in the United States, 1988–90[a]

Consumers	1988 Jan.–Sept. (1000 tons)	1989 Jan.–Sept. (1000 tons)	1990 Jan.–Sept. (1000 tons)	1988–89 change (%)	1989–90 change (%)
Electric utilities	39,112	40,508	41,603	+ 3.6	+ 2.7
Coke and gas plant	1,040	1,215	966	+ 16.8	- 20.5
Retail dealers	212	339	292	+ 59.9	- 13.9
Others	3,226	2,539	2,605	- 21.3	+ 2.6
Used at mine	1	25	62	+2400.0	+148.0
Mine stock (adjusted)	1,734	1,802	2,114	+ 3.9	+ 17.3
Foreign	332	418	342	+ 25.9	- 18.2
Total	43,921	45,044	45,870	+ 2.6	+ 1.8

[a] Source: U.S. Department of Energy, Coal Distribution, January-September, 1988, 1989, and 1990.

Table 25 Coal shipments from Illinois to other states, 1988–90[a]

Consumers	1988 Jan.–Sept. (1000 tons)	1989 Jan.–Sept. (1000 tons)	1990 Jan.–Sept. (1000 tons)	1988–89 change (%)	1989–90 change (%)
Illinois	13,023	12,802	13,994	- 1.7	+ 9.3
Missouri	9,988	10,737	9,717	+ 7.5	- 9.5
Indiana	6,963	7,299	7,690	+ 4.8	+ 5.4
Wisconsin	1,866	1,409	1,094	- 24.5	- 22.4
Georgia	4,298	3,891	3,576	- 9.5	- 8.1
Iowa	1,950	1,887	1,313	- 3.2	- 30.4
Alabama	314	663	897	+111.1	+ 35.3
Florida	3,048	2,859	3,147	- 6.2	+ 10.1
Tennessee	985	1,206	1,637	+ 22.4	+ 35.7
Mississippi	506	1,031	893	+103.8	- 13.4
Other states[b]	648	842	1,570	+ 29.9	+ 86.5
Exports	332	418	342	+ 25.9	- 18.2
Total	43,921	45,044	45,870	+ 2.6	+ 1.8

[a] Source: U.S. Department of Energy, Coal Distribution, January–September, 1988, 1989, and 1990.

[b] Arkansas, Kansas, Kentucky, Michigan, Minnesota, Ohio, (1988, 1989, 1990), California, Texas (1988, 1989), Louisiana (1989), Massachusetts (1988, 1990), Montana (1990), New York (1989), North Dakota (1989), Pennsylvania (1989, 1990), West Virginia (1989), Wyoming (1990).